



STIC Search Report

EIC 1700

STIC Database Tracking Number: 174287

TO: Gregg Cantelmo
Location: REM 6B71
Art Unit : 1745
December 21, 2005

Case Serial Number: 10/620687

From: Ross Shipe
Location: EIC 1700
REMSSEN 4B31
Phone: 571/272-6018
Ross.Shipe@uspto.gov

Search Notes

Examiner Cantelmo:

Please review the attached search results.

If you have any questions or if you would like to refine the search query, please feel free to contact me at any time.

Thanks you for using EIC 1700 search services!

Ross Shipe (ASRC)
Technical Information Specialist

SEARCH REQUEST FORM**Scientific and Technical Information Center**

Requester's Full Name: GREG CASTELMO Examiner #: _____ Date: _____
 Art Unit: _____ Phone Number 30 _____ Serial Number: 10/620682
 Mail Box and Bldg/Room Location: _____ Results Format Preferred (circle): PAPER DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: Lithium Rechargeable Battery
 Inventors (please provide full names): _____

Earliest Priority Filing Date: _____

**For Sequence Searches Only* Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.*

STAFF USE ONLY

	Type of Search	Vendors and cost where applicable
Searcher: <u>ROS</u>	NA Sequence (#) _____	STN <u>✓</u>
Searcher Phone #: _____	AA Sequence (#) _____	Dialog _____
Searcher Location: _____	Structure (#) _____	Questel/Orbit _____
Date Searcher Picked Up: _____	Bibliographic <u>✓</u>	Dr. Link _____
Date Completed: <u>12/21/05</u>	Litigation _____	Lexis/Nexis _____
Searcher Prep & Review Time: <u>30</u>	Fulltext _____	Sequence Systems _____
Clerical Prep Time: _____	Patent Family _____	WWW/Internet _____
Online Time: <u>30 108</u>	Other _____	Other (specify) _____

Mellerson, Kendra

174287

From: "Gregg Cantelmo" [gregg.cantelmo]
Sent: Wednesday, December 14, 2005 4:05 PM
To: STIC-EIC1700
Subject: Database Search Request, Serial Number: 10/620687

Requester:
Gregg Cantelmo (TC1700)
Art Unit:
1745
Employee Number:
75777
Office Location:
REM 6B71
Phone Number:
571-272-1283
Mailbox Number:

Case serial number:
10/620687
Class / Subclass(es):

Earliest Priority Filing Date:

Format preferred for results:
Paper

Search Topic Information:
Alleged novelty lies in the mixed graphite material of claim 1/
Special Instructions and Other Comments:

SCIENTIFIC REFERENCE BR
Sci & Tech Inf. Cntr

DEC 15 RECD

Pat. & T.M. Office



STIC Search Results Feedback Form

EIC17000

Questions about the scope or the results of the search? Contact *the EIC searcher* or contact:

Kathleen Fuller, EIC 1700 Team Leader
571/272-2505 REMSEN 4B28

Voluntary Results Feedback Form

- I am an examiner in Workgroup: Example: 1713
- Relevant prior art **found**, search results used as follows:

- ☐ 102 rejection
- ☐ 103 rejection
- ☐ Cited as being of interest.
- ☐ Helped examiner better understand the invention.
- ☐ Helped examiner better understand the state of the art in their technology.

Types of relevant prior art found:

- ☐ Foreign Patent(s)
- ☐ Non-Patent Literature
(journal articles, conference proceedings, new product announcements etc.)

- Relevant prior art **not found**:

- ☐ Results verified the lack of relevant prior art (helped determine patentability).
- ☐ Results were not useful in determining patentability or understanding the invention.

Comments:

=> d his full

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FILE 'REGISTRY' ENTERED AT 09:48:46 ON 21 DEC 2005
L1      1 SEA ABB=ON  PLU=ON  COPPER/CN
L2      1 SEA ABB=ON  PLU=ON  GRAPHITE/CN

FILE 'HCAPLUS' ENTERED AT 09:49:13 ON 21 DEC 2005
L3      1169095 SEA ABB=ON  PLU=ON  COPPER OR CU OR L1
L4      715431 SEA ABB=ON  PLU=ON  ELECTRODE# OR CATHODE#
L5      191171 SEA ABB=ON  PLU=ON  GRAPHITE# OR BLACK (2A) LEAD OR
      PLUMBAGO## OR L2
L6      2533705 SEA ABB=ON  PLU=ON  ARTIFICIAL? OR SYNTHETIC? OR
      SIMULAT? OR FABRICAT? OR MANMADE OR MAN (A) MADE OR
      ERSATZ OR SUBSTITUT?
L7      827599 SEA ABB=ON  PLU=ON  SPHERICAL? OR ROUND? OR CIRCULAR? OR
      CURV? OR SPHERIOD##
L9      6 SEA ABB=ON  PLU=ON  L7 (2A) L5 AND L6 (2A) L5 AND L4
L12     133 SEA ABB=ON  PLU=ON  L7 (L) L5 AND L6 (L) L5 (L) L4
L13     18855 SEA ABB=ON  PLU=ON  MESOPHASE OR MESOPHASIC
L14     48953 SEA ABB=ON  PLU=ON  PITCH##
L16     2 SEA ABB=ON  PLU=ON  L13 AND L12
L19     6 SEA ABB=ON  PLU=ON  L13 AND L14 AND L4 AND L5 AND L3
L20     51 SEA ABB=ON  PLU=ON  L13 (L) L14 (L) L4 (L) L5
L21     24 SEA ABB=ON  PLU=ON  L13 (L) L14 (L) L4 (L) L5 AND
      ELECTRO?/SC,SC
L22     27 SEA ABB=ON  PLU=ON  L20 NOT L21
L23     25 SEA ABB=ON  PLU=ON  L22 AND (57? OR 51?)/SC
L26     25 SEA ABB=ON  PLU=ON  L23 NOT (L9 OR L16 OR L19 OR L21)
L28     10 SEA ABB=ON  PLU=ON  L26 AND (ELECTRODE# OR CATHODE#)/TI
L29     43 SEA ABB=ON  PLU=ON  L9 OR L16 OR L19 OR L21 OR L28

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FILE 'WPIX' ENTERED AT 11:08:57 ON 21 DEC 2005
L30     9 SEA ABB=ON  PLU=ON  L9 OR L16 OR L19 OR L21 OR L28

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FILE 'INSPEC' ENTERED AT 11:11:39 ON 21 DEC 2005
L31     4 SEA ABB=ON  PLU=ON  L9 OR L16 OR L19 OR L21 OR L28

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FILE 'JICST-EPLUS' ENTERED AT 11:16:02 ON 21 DEC 2005
L32     0 SEA ABB=ON  PLU=ON  L9 OR L16 OR L19 OR L21 OR L28

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FILE 'JAPIO' ENTERED AT 11:16:31 ON 21 DEC 2005
L33     6 SEA ABB=ON  PLU=ON  L9 OR L16 OR L19 OR L21 OR L28

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FILE 'COMPENDEX' ENTERED AT 11:17:21 ON 21 DEC 2005
L34     3 SEA ABB=ON  PLU=ON  L9 OR L16 OR L19 OR L21 OR L28

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=> file wpix

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FILE 'WPIX' ENTERED AT 11:21:03 ON 21 DEC 2005
COPYRIGHT (C) 2005 THE THOMSON CORPORATION

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=> d que l30

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L1      1 SEA FILE=REGISTRY ABB=ON  PLU=ON  COPPER/CN
L2      1 SEA FILE=REGISTRY ABB=ON  PLU=ON  GRAPHITE/CN
L3      1169095 SEA FILE=HCAPLUS ABB=ON  PLU=ON  COPPER OR CU OR L1
L4      715431 SEA FILE=HCAPLUS ABB=ON  PLU=ON  ELECTRODE# OR CATHODE#
L5      191171 SEA FILE=HCAPLUS ABB=ON  PLU=ON  GRAPHITE# OR BLACK (2A)
      LEAD OR PLUMBAGO## OR L2
L6      2533705 SEA FILE=HCAPLUS ABB=ON  PLU=ON  ARTIFICIAL? OR SYNTHETIC
      ? OR SIMULAT? OR FABRICAT? OR MANMADE OR MAN (A) MADE OR

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ERSATZ OR SUBSTITUT?

L7 827599 SEA FILE=HCAPLUS ABB=ON PLU=ON SPHERICAL? OR ROUND? OR
CIRCULAR? OR CURV? OR SPHERIOD##

L9 6 SEA FILE=HCAPLUS ABB=ON PLU=ON L7 (2A) L5 AND L6 (2A)
L5 AND L4

L12 133 SEA FILE=HCAPLUS ABB=ON PLU=ON L7 (L) L5 AND L6 (L) L5
(L) L4

L13 18855 SEA FILE=HCAPLUS ABB=ON PLU=ON MESOPHASE OR MESOPHASIC

L14 48953 SEA FILE=HCAPLUS ABB=ON PLU=ON PITCH##

L16 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L13 AND L12

L19 6 SEA FILE=HCAPLUS ABB=ON PLU=ON L13 AND L14 AND L4 AND
L5 AND L3

L20 51 SEA FILE=HCAPLUS ABB=ON PLU=ON L13 (L) L14 (L) L4 (L)
L5

L21 24 SEA FILE=HCAPLUS ABB=ON PLU=ON L13 (L) L14 (L) L4 (L)
L5 AND ELECTRO?/SC,SC

L22 27 SEA FILE=HCAPLUS ABB=ON PLU=ON L20 NOT L21

L23 25 SEA FILE=HCAPLUS ABB=ON PLU=ON L22 AND (57? OR 51?)/SC

L26 25 SEA FILE=HCAPLUS ABB=ON PLU=ON L23 NOT (L9 OR L16 OR
L19 OR L21)

L28 10 SEA FILE=HCAPLUS ABB=ON PLU=ON L26 AND (ELECTRODE# OR
CATHODE#)/TI

L30 9 SEA FILE=WPIX ABB=ON PLU=ON L9 OR L16 OR L19 OR L21 OR
L28

=> d 130 full 1-9

L30 ANSWER 1 OF 9 WPIX COPYRIGHT 2005 THE THOMSON CORP on STN

AN 2005-435450 [44] WPIX

DNN N2005-353359 DNC C2005-133644

TI Production of carbon negative **electrode** materials for
lithium-ion batteries, for applications in electrical and electronic
industries particularly for e.g. mobile phones, portable computers
and digital cameras.

DC E36 L03 X16

IN HE, Z; MA, J; WANG, J; DING, X; FENG, S; FU, Z; LI, S; ZHANG, D

PA (SHAN-N) SHANGHAI SHANSHAN SCI & TECHNOLOGY CO LTD; (SHAN-N)
SHANGHAI SHANSHAN TECH CO LTD

CYC 108

PI WO 2005055346 A1 20050616 (200544)* ZH 13 H01M004-58

RW: AT BE BG BW CH CY CZ DE DK EA EE ES FI FR GB GH GM GR HU IE
IS IT KE LS LU MC MW MZ NA NL OA PL PT RO SD SE SI SK SL SZ
TR TZ UG ZM ZW

W: AE AG AL AM AT AU AZ BA BB BG BR BW BY BZ CA CH CN CO CR CU
CZ DE DK DM DZ EC EE EG ES FI GB GD GE GH GM HR HU ID IL IN
IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW
MX MZ NA NI NO NZ OM PG PH PL PT RO RU SC SD SE SG SK SL SY
TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA ZM ZW

CN 1624955 A 20050608 (200566) H01M004-04

ADT WO 2005055346 A1 WO 2004-CN1297 20041115; CN 1624955 A CN
2003-1108982 20031201

PRAI CN 2003-1108982 20031201

IC ICM H01M004-04; H01M004-58

ICS C01B031-00

AB WO2005055346 A UPAB: 20050712

NOVELTY - A process for producing carbon negative **electrode**
materials for lithium-ion batteries comprises supplying a coating
material of natural graphite and a coating material of heavy
aromatic hydrocarbon or its mixture, polymerization to give a

coating layer with microcapsulation on surface of the natural graphite, extraction and separation then drying to a dried product for carbonizing or graphitizing.

DETAILED DESCRIPTION - A process for producing carbon negative electrode materials for lithium-ion batteries comprises:

(1) supplying a coating material (A) of natural graphite and a coating material (B) of heavy aromatic hydrocarbon or its mixture, in a weight ratio of (A):(B) = 1:0.5-10;

(2) polymerization of the resultant solid-liquid mixture at 350-500 deg. C, at a pressure of 0.01-10 MPa for 5-450 minutes to give a coating layer with microcapsulation on surface of the natural graphite;

(3) extraction and separation of solid-phase granules in the reaction system;

(4) drying to remove the light component in such solid-phase granules to a dried product that has a weight gain of 2-100%, with respect to graphite raw material; and

(5) carbonizing or graphitizing the product to obtain a carbon negative electrode material that has a surface-coated layer of artificial carbon or artificial graphite at 80-220 deg. C or 2400-3000 deg. C, respectively.

USE - The thus produced batteries are applications in electrical and electronic industries particularly for e.g. mobile phones, portable computers and digital cameras.

ADVANTAGE - Such lithium-ion batteries thus made have high specific capacity and long cycle lifetime.

Dwg.0/0

TECH WO 2005055346 A1UPTX: 20050712

TECHNOLOGY FOCUS - INORGANIC CHEMISTRY - Preferred Materials: The natural graphite is particularly spherical or plate-like natural graphite.

TECHNOLOGY FOCUS - ORGANIC CHEMISTRY - Preferred Materials: The heavy aromatic hydrocarbon or its mixture is selected from tar coal, coal pitch, petroleum pitch and their mixture. The method for separation is by applying a solvent, centrifugation or precipitation. Such method with solvent for separation can employ a solvent chosen from anthracene oil, washing oil, diesel oil, pyridine, quinoline, xylene and toluene, in a weight ratio of such solvent to the reaction product of 0.5-5:1. During drying, the temperature is set at 200-500degreesC. When graphitizing, the graphitization temperature is particularly at 2800- 300degreesC.

ABEX WO 2005055346 A1UPTX: 20050712

EXAMPLE - Spherical natural graphite and tar coal (1:1 in ratio) were reacted at 400degreesC and 0.1 MPa for 60 minutes. After work-up, the resulting product was carbonized at 1000degreesC. Properties of the thus obtained electrode material: D50 = 20.1 microns; weight gain = 6.2%; true density = 2.18 g/cm³; vibration-packed density = 1.25 g/cm³; specific area = 2.6 m²/g; initial discharge capacity = 335 mAh/g; and initial discharge efficiency = 94.3%.

FS CPI EPI

FA AB; DCN

MC CPI: E31-N04B; L03-E01B5

EPI: X16-E01C; X16-E03A; X16-E08

L30 ANSWER 2 OF 9 WPIX COPYRIGHT 2005 THE THOMSON CORP on STN

AN 2004-273975 [26] WPIX

DNN N2004-216708 DNC C2004-107064

TI Activated carbon, useful for electrical double layer capacitor, has preset specific surface area and pore volume.

DC E36 L03 V01 X16 X21

PA (HOND) HONDA MOTOR CO LTD; (KASH-N) KASHIMA SEKIYU KK; (KURS)
KURARAY CHEM CO LTD

CYC 1
PI JP 2004067498 A 20040304 (200426)* 18 C01B031-12

ADT JP 2004067498 A JP 2003-150869 20030528

PRAI JP 2002-173146 20020613

IC ICM C01B031-12

ICS H01G009-058

AB JP2004067498 A UPAB: 20040421

NOVELTY - Activated carbon has Brunauer Emmett Teller (BET) specific surface area of less than 1200 m²/g by nitrogen absorption process, and pore volume of 0.3 ml/g or more, measured with t-plotting method by nitrogen adsorption.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(1) manufacture of activated carbon; and

(2) electrical double layer capacitor (1).

USE - For electrical double layer capacitor (claimed).

ADVANTAGE - The activated carbon is recyclable for a long period of time, and provides an electrical double layer capacitor having high volume capacitance and durability.

DESCRIPTION OF DRAWING(S) - The figure shows a typical perspective view of the electrical double layer capacitor.

electrical double layer capacitor 1

pressure plates 3, 4

electrodes 5, 6

aluminum meshes 7, 8

aluminum wires 9, 10

Dwg.1/4

TECH JP 2004067498 AUPTX: 20040421

TECHNOLOGY FOCUS - INORGANIC CHEMISTRY - Preferred Properties: The BET specific surface area is 700-900 m²/g and the pore volume is 0.3-0.4 ml/g. The molding density of activated carbon by electrolyzing process is 0.80-0.95 g/cm³, and the electrical double layer capacitor has capacitance of more than 30 F/cm³. Preferred Composition: The activated carbon contains 4 wt.% or less of oxygen, and at least one type of functional group with respect to surface functional groups containing 0.5 meq/g or less of carboxyl, quinone, hydroxyl and lactone groups by hydrochloric acid titrimetric method. The activated carbon may further comprise 20 ppm or less of nickel, 5 ppm or less of iron, 1 ppm or less of copper and silver, and 200 ppm or less of transition metal (compound).

Preferred Carbon: The activated carbon is obtained by alkali activation processing a carbon material having **graphite** property.

Preferred Precursor: The carbon precursor is a synthetic **mesophase pitch**.

FS CPI EPI

FA AB; GI; DCN

MC CPI: E11-Q01; E11-Q02; E31-H03; E31-N03; E31-N04C; L03-B03A
EPI: V01-B01A; V01-B01D; X16-L02; X21-B04

L30 ANSWER 3 OF 9 WPIX COPYRIGHT 2005 THE THOMSON CORP on STN

AN 2004-156212 [15] WPIX

DNN N2004-125079 DNC C2004-061955

TI Lithium rechargeable battery for use as driving power source, includes negative **electrode** having active mixture layer of **artificial and spherical graphite** particles fixed on **copper** core material.

DC A85 L03 X16

IN FUJIWARA, S; FUKUMOTO, Y; KATO, F; OURA, T; YAMAMOTO, N

Applicant

PA (MATU) MATSUSHITA DENKI SANGYO KK; (MATU) MATSUSHITA ELECTRIC IND CO LTD

CYC 4
 PI US 2004023115 A1 20040205 (200415)* 8 H01M004-58
 JP 2004127913 A 20040422 (200428) 29 H01M004-02
 CN 1481041 A 20040310 (200437) H01M004-58
 KR 2004012541 A 20040211 (200438) H01M004-60
 ADT US 2004023115 A1 US 2003-620687 20030717; JP 2004127913 A JP 2003-160969 20030605; CN 1481041 A CN 2003-152250 20030730; KR 2004012541 A KR 2003-52624 20030730

PRAI JP 2002-223862 20020731

IC ICM H01M004-02; H01M004-58; H01M004-60
 ICS H01M002-02; H01M004-62; H01M004-66; H01M010-36; H01M010-40

AB US2004023115 A UPAB: 20040302
 NOVELTY - A lithium rechargeable battery comprises positive and negative **electrodes**, and a non-aqueous electrolyte. The negative **electrode** comprises a **copper** core material and a negative **electrode** material mixture layer fixed on the core material. The negative **electrode** material mixture layer includes an active material having a mixture of **artificial graphite** particles and **spherical graphite** particles.

DETAILED DESCRIPTION - A lithium rechargeable battery comprises positive and negative **electrodes** (2, 3), and a non-aqueous electrolyte. The negative **electrode** comprises a **copper** core material and a negative **electrode** material mixture layer fixed on the core material. The negative **electrode** material mixture layer includes an active material having a mixture of **artificial** and **spherical graphite** particles. The **artificial graphite** particles are isotropic **artificial graphite** particles with **graphite** structure oriented at random. They have not more than 3.362 Angstrom inter planar spacing d002 between the (002) planes; not more than 1000 I002/I110 ratio of the peak intensity (I002) attributed to the (002) plane to the peak intensity (I110) attributed to the (110) plane, which are found from a diffraction pattern of the **artificial graphite** particles A molded into a pellet of 1.6 g/cm³ in density; 0.85-0.95 mean **circularity** of the particles; 15-30 μ m particle diameter (D50) corresponding to a volume fraction of 50% and 0.2-0.5 D10/D90 ratio of a particle diameter (D10) corresponding to a volume fraction of 10% to a particle diameter (D90) corresponding to a volume fraction of 90%; not less than 1 g/cm³ tap density after tapping of 900 times with a stroke length of 18 mm; and not more than m²/g specific surface area. The **spherical graphite** particles B have a mean **circularity** of the particles of 0.88-1; D50 corresponding to a volume fraction of 50% of 5-15 μ m; d002 between the (002) planes of not more than 3.357 Angstrom; and not more than 8 m²/g specific surface area.

USE - As driving power source.

ADVANTAGE - The inventive battery is a portable, wireless, compact and lightweight battery having high energy density.

DESCRIPTION OF DRAWING(S) - The figure is an oblique view illustrating a lithium rechargeable battery.

Electrode group 1

Positive and negative **electrodes** 2, 3

Case 4

Sealing plate 5

Dwg.1/1

TECH US 2004023115 A1UPTX: 20040302

TECHNOLOGY FOCUS - CERAMICS AND GLASS - Preferred Material: The

artificial graphite particles A are obtained by kneading and granulating a base material of pulverized bulk mesophase pitch with pitch in a softened state and/or thermosetting resin, carbonizing the resulting granules at 700-1500degreesC, and graphitizing the carbonized granules at 2500-3000degreesC. The spherical graphite particles B are natural graphite particles and/or natural graphite particles partially subjected to reforming treatment to obtain amorphous surfaces. Preferred Composition: The spherical graphite particles B are present at 5-45 wt.%. Preferred Property: The negative electrode material mixture layer has a density of 1.6-1.8 g/cm3 and a thickness of 40-100 mum.

TECHNOLOGY FOCUS - ELECTRICAL POWER AND ENERGY - Preferred Component: The positive and negative electrodes with a separator are wound to form an electrode group (1). The electrode group is accommodated and sealed in a prismatic metal case (4) or a case made of aluminum foil laminate and a resin film.

TECHNOLOGY FOCUS - POLYMERS - Preferred Component: The negative electrode material mixture layer further includes a rubber-like binder containing a butadiene unit and a cellulose-based thickener. Preferred Composition: The rubber-like binder is added at not more than 3 pbw with respect to 100 pbw active material.

FS CPI EPI
FA AB; GI
MC CPI: A12-E06A; A12-E06C; L03-E01B3
EPI: X16-E01C; X16-E08A

L30 ANSWER 4 OF 9 WPIX COPYRIGHT 2005 THE THOMSON CORP on STN

AN 2002-734690 [80] WPIX

DNN N2002-579196 DNC C2002-208090

TI Lead-acid battery for electric cars and elevators, comprises anode which is added with carbon and simple substance and/or compound having catalyst for desulfurization or oxidation of sulfur oxides.

DC E36 J04 L03 X16

IN HONBO, K; HOSHI, E; MURANAKA, Y; TAKEUCHI, S

PA (HITA) HITACHI LTD; (KOBE) SHIN KOBE ELECTRIC MACHINERY; (HONB-I) HONBO K; (HOSH-I) HOSHI E; (MURA-I) MURANAKA Y; (TAKE-I) TAKEUCHI S

CYC 28

PI EP 1248307 A1 20021009 (200280)* EN 31 H01M004-14
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK
NL PT RO SE SI TR

JP 2002367613 A 20021220 (200313) 15 H01M004-62

US 2003049528 A1 20030313 (200321) H01M004-62

US 2004180264 A1 20040916 (200461) H01M004-62

ADT EP 1248307 A1 EP 2002-5531 20020311; JP 2002367613 A JP 2002-67800
20020313; US 2003049528 A1 US 2002-96505 20020313; US 2004180264 A1
Cont of US 2002-96505 20020313, US 2004-812005 20040330

PRAI JP 2001-104080 20010403

IC ICM H01M004-14; H01M004-62

ICS B01J021-18; B01J023-00; H01M004-38

AB EP 1248307 A UPAB: 20021212

NOVELTY - The lead-acid battery comprises an anode, a cathode and an electrolytic solution. The anode is added with carbon, and a simple substance and/or compound having a catalyst for desulfurization or oxidation of sulfur oxides.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for the carbon material used in lead-acid batteries.

USE - For electrical cars, simple hybrid cars, power storage systems, elevators, electric tools, uninterruptable power sources

and distributed power sources.

ADVANTAGE - The lead-acid battery is superior in high-efficiency charging characteristics, due to the addition of carbon and simple substance and/or compound having a catalyst, to the anode. The conductivity of lead sulfate, and the solubility of lead sulfate into the lead ion are improved, hence the charging reaction of anode active material proceeds smoothly. The carbon material used in anode has superior charge acceptability. The battery exhibits a small energy loss due to the gas generated during large-current charging. The current value necessary to discharge the total discharge capacity of the battery in 0.5 hour and 1 hour, are 2C and 1C, respectively. The carbon can be adsorbed on the reaction interface of the active material of the lead-acid battery, thereby the passivation of lead sulfate which is called sulfation can be suppressed, no passivation proceeds even when complete discharge has been made and charge acceptability is remarkably improved.

DESCRIPTION OF DRAWING(S) - The figure shows the model of the catalyst used for desulfurization.

Dwg.6/8

TECH EP 1248307 A1 UPTX: 20021212
 TECHNOLOGY FOCUS - INORGANIC CHEMISTRY - Preferred Catalyst: The catalyst, is catalyst used for petroleum refining, fuel oil desulfurization, gas production or pollution control.
 Preferred Substance: The simple substance is an oxide, sulfate, hydroxide and/or carbide of hafnium, niobium, tantalum, tungsten, silver, zinc, nickel, copper, molybdenum, copper, vanadium, manganese, barium, potassium, cesium, rubidium, strontium and sodium. The carbon is carbon black, acetylene black, natural graphite, artificial graphite, pyrolytic carbon, coke, isotropic graphite, mesophase carbon, pitch-based carbon fiber, carbon fiber by vapor phase growth, carbon fluoride, nanocarbon, active carbon, active carbon fiber or polyacrylonitrile-based fiber.

FS CPI EPI
 FA AB; GI; DCN
 MC CPI: E11-Q02; E31-F01A; E31-N04; E31-N05A; E33; E34; E35; J04-E04;
 L03-E01B; L03-E01B1; N06
 EPI: X16-E04

L30 ANSWER 5 OF 9 WPIX COPYRIGHT 2005 THE THOMSON CORP on STN
 AN 2002-398958 [43] WPIX
 DNN N2002-312950 DNC C2002-112497
 TI Carbon film manufacture for electrodes of non-aqueous electrolyte secondary battery, involves dispersing carbon material in aprotic solvent in which electroconductive substrate and counter electrode are soaked.

DC L03 X12 X16
 PA (KOUR-I) KOURA N; (SHAF) SHARP KK
 CYC 1
 PI JP 2002063894 A 20020228 (200243)* 16 H01M004-04
 ADT JP 2002063894 A JP 2000-251100 20000822
 PRAI JP 2000-251100 20000822
 IC ICM H01M004-04
 ICS C25B007-00; H01B001-04; H01M004-02; H01M004-58; H01M004-66;
 H01M010-40

AB JP2002063894 A UPAB: 20020709
 NOVELTY - A carbon material (2) is dispersed in an aprotic solvent (1) in which iodine is dissolved. An electroconductive substrate and a counter electrode are soaked in the solvent as cathode (31) and anode (32), respectively. A carbon film is made to deposit on the surface of electroconductive substrate by electrophoresis electrodeposition, when a direct flow electric field

is impressed between the **electrodes**.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for non-aqueous electrolyte secondary battery.

USE - For **electrodes** of non-aqueous electrolyte secondary battery (claimed).

ADVANTAGE - The carbon film is directly deposited on the substrate by simple method. The carbon film has reduced weight and high industrial utility. The active material density of **electrode** formed from carbon film is increased.

DESCRIPTION OF DRAWING(S) - The figure shows outline view of manufacture of carbon film.

Aprotic solvent 1

Carbon material 2

Cathode 31

Anode 32

Dwg.1/8

TECH JP 2002063894 AUPTX: 20020709

TECHNOLOGY FOCUS - ORGANIC CHEMISTRY - Preferred Compounds: The aprotic solvent is acetone or acetyl acetone. The carbon material is chosen from artificial **graphite**, natural **graphite**, high crystalline **graphite**, **mesophase**

pitch, isotropic **pitch**, mesocarbon micro beads and coke. The electroconductive substrate comprises **copper**, nickel, stainless steel, brass, molybdenum and tungsten.

FS CPI EPI

FA AB; GI

MC CPI: L03-E01B9

EPI: X12-D01C; X16-B01F; X16-E01; X16-E01C; X16-E01G; X16-E02

L30 ANSWER 6 OF 9 WPIX COPYRIGHT 2005 THE THOMSON CORP on STN

AN 2000-507805 [46] WPIX

DNN N2000-375557 DNC C2000-152320

TI Negative **electrode** for non-aqueous electrolyte secondary battery, has carbon material with aggregated **graphite** powder and **mesophase pitch** type **graphite** fibers.

DC A14 A85 L03 X16

PA (KOBEL) SHIN KOBEL ELECTRIC MACHINERY

CYC 1

PI JP 2000156226 A 20000606 (200046)* 5 H01M004-58

ADT JP 2000156226 A JP 1998-327923 19981118

PRAI JP 1998-327923 19981118

IC ICM H01M004-58

ICS H01M004-02; H01M004-62; H01M010-40

AB JP2000156226 A UPAB: 20000921

NOVELTY - The **electrode** consists of a rolled **copper** foil on which a mixture of carbon material and polyvinylidene fluoride resin binder is adhered. The carbon material consists of aggregated **graphite** powder and **mesophase pitch** type **graphite** fiber material.

USE - For non-aqueous secondary battery e.g. nickel-cadmium battery, lead battery, nickel hydrogen battery used in portable telephone, notebook personal computer.

ADVANTAGE - The mixture density and mixture adhesion are raised by the usage of aggregated **graphite** powder and **mesophase graphite** powder, thus irreversible capacitance and the gas evolution at high temperature is suppressed. The peeling and the crack of a mixture layer is prevented, thus excellent cycle property is obtained.

Dwg.0/0

FS CPI EPI

FA AB
MC CPI: A04-E10B; A12-E06; L03-E01B3
EPI: X16-B01F; X16-E01C; X16-E09

L30 ANSWER 7 OF 9 WPIX COPYRIGHT 2005 THE THOMSON CORP on STN
AN 1989-238387 [33] WPIX
DNN N1989-181475 DNC C1989-106466
TI Electrochemical detector for high speed liq. chromatography - has
cell with working **electrode** composed of synthetic polymer
cpd. and graphite, counter-**electrode**, reference
electrode, etc..
DC A89 B04 J04 S03
PA (ACOM-N) ACOM KK; (SEKI) SEKISUI CHEM IND CO LTD
CYC 1
PI JP 01173861 A 19890710 (198933)* 7
ADT JP 01173861 A JP 1987-335803 19871228
PRAI JP 1987-335803 19871228
IC G01N027-46; G01N030-64
AB JP 01173861 A UPAB: 19930923
An electrochemical detector for high speed liq chromatography having
a cell with a working **electrode**, a counter
electrode and a reference **electrode**, and detection
part is claimed where the working **electrode** is constructed
of a compn mainly consisting of a synthesised polymer cpd and
spherical graphite carbon.
In the compn, the amnt of the **spherical**
graphite carbon is pref 20 - 80 wt %. The synthesised
polymer cpd is not specially limited, but it must be a material
which is not dissolved or swelled with the eluate of the liq
chromatography. For example, fluorine resin, polyphenylene sulphide
resin etc are pref.
USE/ADVANTAGE - An electrochemical detector which enables the
measurement of high sensitivity is obtd. It is esp useful for
measuring vitamins, steroids, and various chemicals in a sample
which is sepd by high speed liq chromatography.
0/0
FS CPI EPI
FA AB; DCN
MC CPI: A12-E14; A12-L04; A12-V03C2; B03-L; B04-B02D; B04-C03; B05-C06;
B11-C08B; B11-C08D2; B12-K04; J04-B01C
EPI: S03-E03; S03-E03C; S03-E09C5

L30 ANSWER 8 OF 9 WPIX COPYRIGHT 2005 THE THOMSON CORP on STN
AN 1989-123644 [17] WPIX
DNN N1989-094269 DNC C1989-054780
TI Exothermic conductive coating compsns. - contg. spherical carbon
particles, and synthetic resin, used in heating units with uniform
temp. distribution up to 450 deg. C.
DC A28 A32 G02 L03 P73 X25 X27
IN OTA, T
PA (ASKH-N) ASK HEATING KK; (OTAT-I) OTA T; (ASKH-N) ASK HEATING CO
LTD; (OHOT-I) OHOTA T
CYC 12
PI EP 312688 A 19890426 (198917)* EN 17
R: CH DE FR GB LI NL SE
JP 01107488 A 19890425 (198922)
JP 01108276 A 19890425 (198923)
NO 8802116 A 19890516 (198925)
EP 312688 B1 19930107 (199302) EN 18 C09D005-24
R: CH DE FR GB LI NL SE
DE 3877314 G 19930218 (199308) C09D005-24
CA 1323717 C 19931026 (199349) C09D005-24

NO 173878 B 19931108 (199350) C09D005-24
 JP 06089270 B2 19941109 (199443) 7 C09D005-24
 KR 9401521 B1 19940223 (199503) C09D005-24
 US 5407741 A 19950418 (199521) 14 B32B005-16
 ADT EP 312688 A EP 1988-107673 19880513; JP 01107488 A JP 1987-263955
 19871021; JP 01108276 A JP 1987-263954 19871021; EP 312688 B1 EP
 1988-107673 19880513; DE 3877314 G DE 1988-3877314 19880513, EP
 1988-107673 19880513; CA 1323717 C CA 1988-566767 19880513; NO
 173878 B NO 1988-2116 19880513; JP 06089270 B2 JP 1987-263954
 19871021; KR 9401521 B1 KR 1988-5615 19880513; US 5407741 A Cont of
 US 1988-192143 19880510, Cont of US 1991-663086 19910228, US
 1993-13177 19930129
 FDT DE 3877314 G Based on EP 312688; NO 173878 B Previous Publ. NO
 8802116; JP 06089270 B2 Based on JP 01108276
 PRAI JP 1987-263955 19871021; JP 1987-263954 19871021
 REP 4.Jnl.Ref; A3...199101; JP 52115445; JP 60008377; JP 61235471;
 No-SR.Pub; US 4035265
 IC ICM B32B005-16; C09D005-24
 AB ICS C09D005-00; H01B001-24; H05B003-14
 EP 312688 A UPAB: 20010910
 An exothermic conductive coating compsn comprises (i) carbon
 particles which mainly (pref at least 60 wt%) consist of spherical
 particles of dia not more than 500 microns; and (ii) a synthetic
 resin, pref a polyester resin, epoxy resin, polyamide, polyimide,
 polyethylene, F-contg polymer, polyetheretherketone, poly-phenylene
 sulphide, silicone resin or poly-titanocarbosilane resin and pref as
 25-220 pts wt per 100 pts wt of (a).
 Pref particles (i) have been heat treated at least 1500 deg.C
 and have an interplanar spacing in the crystalline structure of
 3.425-3.358 Angstroms.
 USE - Also claimed are conductive heating units which comprise
 a film of (i) plus (ii) on a shaped solid surface having
electrode terminals mounted on it; in a claimed variant
 there may be further laminated exothermic layers, each of which has
electrode terminals. The heating units can be used in
 interior walls, flooring, roofing, furnace inner surfaces, pipe
 surfaces, carpets, blankets etc.
 ADVANTAGE - The compsns show uniform temp distribution and can
 produce arbitrarily adjustable temps up to 450 deg.C. Heating units
 can be prepd from complex-shaped substrates (e.g. with holes or
 surface unevenness) without localised over heating (cf use of
 needle-like, flake or fibrous carbon particles which does cause
 overheating).
 Dwg.12/12
 FS CPI EPI GMPI
 FA AB; GI
 MC CPI: A12-B01; A12-E10; G02-A05; G02-A05B; L03-A02E; L03-H04A
 EPI: X25-B01B; X27-E01A3; X27-E02
 L30 ANSWER 9 OF 9 WPIX COPYRIGHT 2005 THE THOMSON CORP on STN
 AN 1975-H6109W [30] WPIX
 TI Electric or solar energy heat store - has graphite and coal storage
 medium contained under vacuum in reflector-walled vessel.
 DC Q55
 PA (SCHM-I) SCHMID A W
 CYC 1
 PI DE 2401859 A 19750717 (197530)*
 PRAI DE 1974-2401859 19740116
 IC F03G007-02
 AB DE 2401859 A UPAB: 19930831
 The store has a central graphite **electrode** surrounded by
 the storage medium in the form of **spherical** elements of

graphite or synthetic coal. The medium is contained in a graphite container surrounded by heat reflectors made of relatively thin graphite cylinders. The assembly is contained in an evacuated steel cylinder which also encloses a heat exchanger through which heat can be withdrawn from the store. In a modification the sun is used as a heat source, the rays being entered into the store through mirrors. The use of graphite or coal as the storage medium allows storage temperatures up to 3273 deg. K.

FS GMPI
FA AB

=> file hcaplus

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FILE LAST UPDATED: 20 Dec 2005 (20051220/ED)

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L4	715431	SEA FILE=HCAPLUS ABB=ON	PLU=ON	ELECTRODE# OR CATHODE#
L5	191171	SEA FILE=HCAPLUS ABB=ON	PLU=ON	GRAPHITE# OR BLACK (2A) LEAD OR PLUMBAGO## OR L2
L6	2533705	SEA FILE=HCAPLUS ABB=ON	PLU=ON	ARTIFICIAL? OR SYNTHETIC ? OR SIMULAT? OR FABRICAT? OR MANMADE OR MAN (A) MADE OR ERSATZ OR SUBSTITUT?
L7	827599	SEA FILE=HCAPLUS ABB=ON	PLU=ON	SPHERICAL? OR ROUND? OR CIRCULAR? OR CURV? OR SPHERIOD##
L9	6	SEA FILE=HCAPLUS ABB=ON	PLU=ON	L7 (2A) L5 AND L6 (2A) L5 AND L4
L12	133	SEA FILE=HCAPLUS ABB=ON	PLU=ON	L7 (L) L5 AND L6 (L) L5 (L) L4
L13	18855	SEA FILE=HCAPLUS ABB=ON	PLU=ON	MESOPHASE OR MESOPHASIC
L14	48953	SEA FILE=HCAPLUS ABB=ON	PLU=ON	PITCH##
L16	2	SEA FILE=HCAPLUS ABB=ON	PLU=ON	L13 AND L12
L19	6	SEA FILE=HCAPLUS ABB=ON	PLU=ON	L13 AND L14 AND L4 AND L5 AND L3
L20	51	SEA FILE=HCAPLUS ABB=ON	PLU=ON	L13 (L) L14 (L) L4 (L) L5
L21	24	SEA FILE=HCAPLUS ABB=ON	PLU=ON	L13 (L) L14 (L) L4 (L)

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L22      L5 AND ELECTRO?/SC,SC
L23      27 SEA FILE=HCAPLUS ABB=ON PLU=ON L20 NOT L21
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L26      25 SEA FILE=HCAPLUS ABB=ON PLU=ON L23 NOT (L9 OR L16 OR
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L28      10 SEA FILE=HCAPLUS ABB=ON PLU=ON L26 AND (ELECTRODE# OR
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L29      43 SEA FILE=HCAPLUS ABB=ON PLU=ON L9 OR L16 OR L19 OR L21
          OR L28

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          PITCH##
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L20     51 SEA FILE=HCAPLUS ABB=ON PLU=ON L13 (L) L14 (L) L4 (L)
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L6      2533705 SEA FILE=HCAPLUS ABB=ON PLU=ON ARTIFICIAL? OR SYNTHETIC
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 LEAD OR PLUMBAGO## OR L2
 L6 2533705 SEA FILE=HCAPLUS ABB=ON PLU=ON ARTIFICIAL? OR SYNTHETIC
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 L5 AND L4
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 (L) L4
 L13 18855 SEA FILE=HCAPLUS ABB=ON PLU=ON MESOPHASE OR MESOPHASIC
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 L5
 L21 24 SEA FILE=HCAPLUS ABB=ON PLU=ON L13 (L) L14 (L) L4 (L)
 L5 AND ELECTRO?/SC,SC
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 L26 25 SEA FILE=HCAPLUS ABB=ON PLU=ON L23 NOT (L9 OR L16 OR
 L19 OR L21)
 L28 10 SEA FILE=HCAPLUS ABB=ON PLU=ON L26 AND (ELECTRODE# OR
 CATHODE#)/TI
 L32 0 SEA FILE=JICST-EPLUS ABB=ON PLU=ON L9 OR L16 OR L19 OR
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 PROCESSING COMPLETED FOR L31
 PROCESSING COMPLETED FOR L33
 PROCESSING COMPLETED FOR L34
 L35 53 DUP REM L29 L31 L33 L34 (3 DUPLICATES REMOVED)

=> d all 135 1-53

L35 ANSWER 1 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN
 AN 2005:523824 HCAPLUS
 DN 143:46084
 ED Entered STN: 17 Jun 2005
 TI A process of production of carbon negative electrode
 material for lithium ion battery
 IN Ma, Junqi; Wang, Jianqiao; Fu, Zhenming; Ding, Xiaoyang; Li,
 Shaoming; Zhang, Dianhao; Feng, Suning
 PA Shanghai Shanshan Tech Co., Ltd., Peop. Rep. China
 SO PCT Int. Appl., 13 pp.
 CODEN: PIXXD2
 DT Patent
 LA Chinese
 IC ICM H01M004-58
 ICS H01M004-04; C01B031-00
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 49, 51

FAN.CNT 1		PATENT NO.		KIND	DATE	APPLICATION NO.	DATE
		-----	-----	---	-----	-----	
PI	WO 2005055346		A1	20050616	WO 2004-CN1297		20041115

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA,
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 MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD,
 SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,
 VC, VN, YU, ZA, ZM, ZW
 RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW,
 AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ,

DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LU, MC, NL,
 PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN,
 GQ, GW, ML, MR, NE, SN, TD, TG

PRAI CN 2003-10108982 A 20031201

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
WO 2005055346	ICM	H01M004-58
	ICS	H01M004-04; C01B031-00
	IPCI	H01M0004-58 [ICM,7]; H01M0004-04 [ICS,7]; C01B0031-00 [ICS,7]

- AB The present invention provides a carbon neg. **electrode** material for lithium ion battery by using natural **graphite**, esp. **spherical natural graphite** as raw material A, coal tar/coal pitch/petroleum pitch or mixt. thereof as raw material B, mixing the raw materials in a ratio of 1/0.5-10 of A to B, the resultant mixt. subjecting to polymn. reaction at a temp. of 350-500 °C under the pressure of 0.01 to 10 MPa for 5 to 420 min, drying the resultant product after extn. and sepn., the dried product having the wt. gain of 2-100 % compared with raw material of graphite, finally, carbonizing or graphitizing the product to obtain carbon neg. **electrode** material having a coated layer of artificial carbon or **artificial graphite**. The carbon neg. **electrode** material for lithium ion battery has advantages of high specific capacity, long cycle lifetime and the like, is a desirable carbon neg. **electrode** material.
- ST carbonization graphitization graphite coal tar petroleum pitch battery anode
- IT Electric capacitance
(high specific capacity; process of prodn. of carbon neg. **electrode** material for lithium ion battery)
- IT Secondary batteries
(lithium; process of prodn. of carbon neg. **electrode** material for lithium ion battery)
- IT Polymerization
(of graphite and pitches; process of prodn. of carbon neg. **electrode** material for lithium ion battery)
- IT Battery anodes
Carbonization
Coal tar pitch
Drying
Extraction
Graphitization
Petroleum pitch
(process of prodn. of carbon neg. **electrode** material for lithium ion battery)
- IT Coal tar
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
(process of prodn. of carbon neg. **electrode** material for lithium ion battery)
- IT 7782-42-5P, Graphite, uses
RL: DEV (Device component use); IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(process of prodn. of carbon neg. **electrode** material for lithium ion battery)
- IT 7440-44-0, Carbon, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(process of prodn. of carbon neg. **electrode** material

for lithium ion battery)
RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD

- RE
(1) Fudan University; CN 1274957 A 2000 HCAPLUS
(2) He, M; Carbon 2002, V3, P3
(3) Jiang, H; Carbon 2001, V3, P12
(4) Shanghai Shanshan Tech Co Ltd; CN 1382624 A 2002 HCAPLUS
(5) Song, W; Chinese J Power Sources 2002, V26(6), P428 HCAPLUS
(6) Song, W; Study on composite materials prepared by coal pitch coating on natural flake Graphite used as carbon cathode materials for lithium ion secondary batteries 2001, V20(6), P27

L35 ANSWER 2 OF 53 INSPEC (C) 2005 IEE on STN
AN 2005:8473336 INSPEC DN A2005-16-8245-003; B2005-08-8410E-015
TI Study of **mesophase pitch-based graphite**
foam used as anodic materials in lithium ion rechargeable batteries.
AU Jie Yang; Zeng-Min Shen; Rui-Sheng Xue (Inst. of Carbon Fibers & Composites, Beijing Univ. of Chem. Technol., China); Zhi-Biao Hao
SO Journal of Materials Science (1 March 2005) vol.40, no.5, p.1285-7.
15 refs.
Published by: Kluwer Academic Publishers
CODEN: JMTSAS ISSN: 0022-2461
SICI: 0022-2461(20050301)40:5L:1285:SMPB;1-5
DT Journal
TC Experimental
CY United States
LA English
AB We attempt to investigate the **mesophase pitch** carbon foams heat treated at high temperature as anode materials for lithium ion secondary batteries. The foaming technique used in this study is similar to that reported by Klett et al where powders of **mesophase pitch** were synthesized from FCC decant oil. The foams were characterized by X-ray diffraction. The **electrodes** were prepared by coating slurries of the carbon foams powder (90 wt%) polyvinylidene fluoride (PVDF, 10 wt%) dissolved in N-methyl pyrrolidinone (NMP) on **copper** foil. The carbon foams exhibit a superior anode performance with stable capacitance that can reach as high as 306 mAhg⁻¹.
CC A8245 Electrochemistry and electrophoresis; A8630F Secondary cells; A8270R Aerosols and foams; A8120V Preparation of fullerenes and fullerene-related materials, intercalation compounds, and diamond; A8270K Emulsions and suspensions; A8140G Other heat and thermomechanical treatments; B8410E Secondary cells
CT CAPACITANCE; ELECTROCHEMICAL **ELECTRODES**; FOAMS; **GRAPHITE**; HEAT TREATMENT; SECONDARY CELLS; SLURRIES; X-RAY DIFFRACTION
ST **mesophase pitch-based graphite foam**; anodic materials; lithium ion rechargeable batteries; heat treatment; lithium ion secondary batteries; foaming technique; powders; FCC decant oil; X-ray diffraction; slurries; polyvinylidene fluoride; N-methyl pyrrolidinone; capacitance; C
CHI C el
ET N; C

L35 ANSWER 3 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2004:100617 HCAPLUS
DN 140:114301
ED Entered STN: 08 Feb 2004
TI Lithium rechargeable battery
IN Kato, Fumio; Oura, Takafumi; Fukumoto, Yusuke; Yamamoto, Norihiro; Fujiwara, Shozo
PA Matsushita Electric Industrial Co., Ltd., Japan

SO U.S. Pat. Appl. Publ., 18 pp.

CODEN: USXXCO

DT Patent

LA English

IC ICM H01M004-58

ICS H01M004-62; H01M004-66

INCL 429231800; 429245000; 429217000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2004023115	A1	20040205	US 2003-620687	20030717
JP 2004127913	A2	20040422	JP 2003-160969	20030605
CN 1481041	A	20040310	CN 2003-152250	20030730

PRAI JP 2002-223862 A 20020731

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 2004023115	ICM	H01M004-58
	ICS	H01M004-62; H01M004-66
	INCL	429231800; 429245000; 429217000
	IPCI	H01M0004-58 [ICM,7]; H01M0004-62 [ICS,7]; H01M0004-66 [ICS,7]
JP 2004127913	NCL	429/231.800
	IPCI	H01M0004-02 [ICM,7]; H01M0002-02 [ICS,7]; H01M0004-58 [ICS,7]; H01M0004-62 [ICS,7]; H01M0004-66 [ICS,7]; H01M0010-40 [ICS,7]
	FTERM	5H011/AA03; 5H011/AA09; 5H011/AA13; 5H011/BB03; 5H011/CC06; 5H011/CC10; 5H017/AA03; 5H017/AS01; 5H017/AS10; 5H017/CC01; 5H017/EE01; 5H017/HH05; 5H029/AJ02; 5H029/AJ03; 5H029/AJ05; 5H029/AJ12; 5H029/AK03; 5H029/AL07; 5H029/AM03; 5H029/AM05; 5H029/AM07; 5H029/BJ02; 5H029/BJ14; 5H029/CJ02; 5H029/CJ08; 5H029/DJ02; 5H029/DJ08; 5H029/DJ16; 5H029/DJ17; 5H029/EJ01; 5H029/EJ03; 5H029/EJ13; 5H029/HJ01; 5H029/HJ05; 5H029/HJ07; 5H029/HJ08; 5H029/HJ13; 5H029/HJ14; 5H050/AA02; 5H050/AA06; 5H050/AA07; 5H050/AA08; 5H050/AA15; 5H050/AA19; 5H050/BA17; 5H050/CA08; 5H050/CB08; 5H050/DA11; 5H050/EA28; 5H050/FA05; 5H050/FA17; 5H050/FA19; 5H050/GA02; 5H050/GA05; 5H050/GA06; 5H050/GA10; 5H050/HA01; 5H050/HA05; 5H050/HA07; 5H050/HA08; 5H050/HA13; 5H050/HA14
CN 1481041	IPCI	H01M0004-58 [ICM,7]; H01M0004-62 [ICS,7]; H01M0010-36 [ICS,7]; H01M0010-40 [ICS,7]

AB The present invention provides a lithium rechargeable battery including a neg. **electrode** comprising a **copper** core material, to which is fixed an active material made by mixing **artificial graphite** particles obtained by kneading and granulating a base material of pulverized bulk **mesophase pitch** with **pitch** in a softened state and/or thermosetting resin, carbonizing the resulting granules at 700 to 1500° and graphitizing the carbonized granules at 2500 to 3000° with **spherical graphite** particles

having a high mean circularity, with a view to inhibiting the deterioration in battery capacity through the repeated charge/discharge cycles, which occurs remarkably in a high energy d. lithium rechargeable battery, and providing excellent discharge characteristic and safety.

ST battery lithium secondary; safety lithium rechargeable battery
IT Battery anodes
Battery cathodes
Coal tar pitch
Mesophase pitch
(lithium rechargeable battery)

IT Coal tar
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
(lithium rechargeable battery)

IT Secondary batteries
(lithium; lithium rechargeable battery)

IT Plastics, uses
RL: MOA (Modifier or additive use); USES (Uses)
(thermosetting; lithium rechargeable battery)

IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate
623-53-0, Ethyl methyl carbonate 7440-50-8, Copper
, uses 7782-42-5, Graphite, uses 12190-79-3,
Cobalt lithium oxide colio2 21324-40-3, Lithium
hexafluorophosphate
RL: DEV (Device component use); USES (Uses)
(lithium rechargeable battery)

L35 ANSWER 4 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN

AN 2004:900943 HCAPLUS

DN 141:382112

ED Entered STN: 28 Oct 2004

TI Production of spherical graphite particles and its use in lithium ion secondary battery cathode material

IN Sakai, Minoru; Nagayama, Katsuhiko; Hatano, Hitomi; Morioka, Hironori; Honma, Makoto

PA JFE Chemical Corporation, Japan

SO Jpn. Kokai Tokkyo Koho, 17 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM C01B031-04

ICS H01M004-02; H01M004-58; H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 49

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2004299944	A2	20041028	JP 2003-93308	20030331

PRAI JP 2003-93308

20030331

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2004299944	ICM	C01B031-04
	ICS	H01M004-02; H01M004-58; H01M010-40
	IPCI	C01B0031-04 [ICM,7]; H01M0004-02 [ICS,7]; H01M0004-58 [ICS,7]; H01M0010-40 [ICS,7]
	FTERM	4G146/AA02; 4G146/AA23; 4G146/AB01; 4G146/AB02;

4G146/AC02A; 4G146/AC02B; 4G146/AC17A;
 4G146/AC17B; 4G146/AC22A; 4G146/AC22B;
 4G146/AD03; 4G146/AD11; 4G146/AD25; 4G146/BA22;
 4G146/BA23; 4G146/BA43; 4G146/BA49; 4G146/BB03;
 4G146/BB06; 4G146/BB18; 4G146/BC04; 4G146/BC32A;
 4G146/BC32B; 5H029/AJ03; 5H029/AJ05; 5H029/AK02;
 5H029/AK03; 5H029/AK05; 5H029/AK08; 5H029/AL07;
 5H029/AM02; 5H029/AM03; 5H029/AM04; 5H029/AM05;
 5H029/AM07; 5H029/AM16; 5H029/BJ03; 5H029/CJ02;
 5H029/CJ08; 5H029/EJ12; 5H029/HJ01; 5H029/HJ05;
 5H029/HJ06; 5H029/HJ08; 5H029/HJ10; 5H029/HJ13;
 5H029/HJ14; 5H050/AA07; 5H050/AA08; 5H050/BA17;
 5H050/CA02; 5H050/CA11; 5H050/CA16; 5H050/CB08;
 5H050/EA24; 5H050/GA02; 5H050/GA10; 5H050/HA01;
 5H050/HA05; 5H050/HA06; 5H050/HA08; 5H050/HA13;
 5H050/HA14

- AB Spherical **graphite** particles are produced from **mesophase pitch** micro beads (av. grain diam. 20-60 μ m) by calcining at 350-450° to obtain **graphite** precursors contg. 4-20 wt.% volatile matter, and then graphitizing at $\geq 2000^\circ$, preferably 2800-3200° to obtain cryst. **graphite** particles having apparent sp. gr. 6.0 (detd. by JIS R7222-1997), d. 2.210-2.240 g/cm³, and inner pore diam. 0.1-30 μ m. The secondary battery **cathode** has larger service capacity around cubic measure, and does not cause deterioration in cycle quality.
- ST secondary lithium battery cathode graphite particle size control
- IT **Mesophase pitch**
 (coal tar; prodn. of spherical **graphite** particles and its use in lithium ion secondary battery **cathode** material)
- IT Coal tar **pitch**
 (**mesophase**; prodn. of spherical **graphite** particles and its use in lithium ion secondary battery **cathode** material)
- IT Battery cathodes
 (prodn. of spherical graphite particles and its use in lithium ion secondary battery cathode material)
- IT 7440-44-0, Carbon, uses
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (meso phase; micro beads; prodn. of spherical graphite particles and its use in lithium ion secondary battery cathode material)
- IT 7782-42-5P, Graphite, preparation
 RL: IMF (Industrial manufacture); PREP (Preparation)
 (prodn. of spherical graphite particles and its use in lithium ion secondary battery cathode material)
- L35 ANSWER 5 OF 53 INSPEC (C) 2005 IEE on STN DUPLICATE 1
- AN 2005:8414410 INSPEC DN A2005-13-8245-011; B2005-07-8410E-001
- TI Anomalous improvement of the electrochemical properties of mesocarbon microbeads by Ar-H₂-SF₆ thermal plasma treatment.
- AU Tanaka, H.; Xu, J.Y. (Nat. Inst. for Mater. Sci., Ibaraki, Japan); Kurihara, M.; Maruyama, S.; Ohashi, N.; Moriyoshi, Y.; Ishigaki, T.
- SO Carbon (2004) vol.42, no.15, p.3229-35. 22 refs.
 Published by: Elsevier
 Price: CCCC 0008-6223/2004/\$30.00
 CODEN: CRBNAH ISSN: 0008-6223
 SICI: 0008-6223(2004)42:15L.3229:AI EP;1-5
- DT Journal
- TC Practical; Experimental

CY United Kingdom
 LA English
 AB Highly graphitized mesocarbon microbead (MCMB) powders, which consist of **spherical artificial graphite** particles, were treated in Ar-H₂-SF₆ radio-frequency inductively coupled thermal plasma. The results of X-ray diffractometry, scanning electron microscopy, Fourier transform infrared spectroscopy, Raman spectroscopy, X-ray photoelectron spectroscopy, and element analysis showed that the plasma treatment greatly affected the surface structure and chemical composition of the MCMB powders. Sulfur and fluorine could be incorporated into the particle by treating them with plasma containing SF₆, and this plasma modification improved the electrochemical properties of the powders. A lithium-ion rechargeable cell with a negative **electrode** of plasma-treated powder had a discharge capacity as much as 13% greater than that of a cell with a negative **electrode** of untreated powder, while its irreversible capacity loss (ICL) was as much as 9% less. The specific ICL calculated by dividing the ICL by surface area decreased as the BET surface area increased. Furthermore, a new plateau near 2 V was added to the discharge curve by treating the MCMB powder with SF₆ plasma but not by treating it with Ar-H₂, Ar-N₂, Ar-H₂-CO₂, or Ar-N₂-CO₂ plasmas. The incorporation of sulfur and fluorine should be a key factor for the improvement of negative **electrode** characteristics.

CC A8245 Electrochemistry and electrophoresis; A8280P Electron spectroscopy for chemical analysis (photoelectron, Auger spectroscopy, etc.); A7830G Infrared and Raman spectra in inorganic crystals; A7960 Photoemission and photoelectron spectra (condensed matter); A5250G Plasma heating; A8630F Secondary cells; A6820 Solid surface structure; B8410E Secondary cells

CT ELECTROCHEMICAL **ELECTRODES**; ELECTROCHEMISTRY; FLUORINE; FOURIER TRANSFORM SPECTRA; GRAPHITE; INFRARED SPECTRA; PLASMA RADIOFREQUENCY HEATING; POWDERS; RAMAN SPECTRA; SCANNING ELECTRON MICROSCOPY; SECONDARY CELLS; SULPHUR; SURFACE STRUCTURE; X-RAY DIFFRACTION; X-RAY PHOTOELECTRON SPECTRA

ST electrochemical properties; mesocarbon microbeads; **spherical artificial graphite particles**; X-ray diffractometry; scanning electron microscopy; Fourier transform infrared spectroscopy; Raman spectroscopy; X-ray photoelectron spectroscopy; element analysis; surface structure; chemical composition; irreversible capacity loss; sulfur; fluorine; **negative electrode**; radio-frequency inductively coupled thermal plasma; Li; C

CHI Li el; C sur, C el
 ET Ar*F*H*S; SF₆; S cp; cp; F cp; Ar-H₂-SF₆; F*S; Ar*H; Ar-H₂; Ar*N; Ar-N₂; C*H*Ar*O; CO₂; C cp; O cp; Ar-H₂-CO₂; C*Ar*N*O; Ar-N₂-CO₂; Li; C

L35 ANSWER 6 OF 53 COMPENDEX COPYRIGHT 2005 EEI on STN
 AN 2004(31):7670 COMPENDEX
 TI Effect of intercalation on electrical and mechanical properties of C/C composites.
 AU Macherzynska, B. (Department of Advanced Ceramics Fac. of Mat. Science and Ceramics AGH Univ. of Science and Technology, 30-059 Crakow, Poland); Blazewicz, S.
 SO Journal of Physics and Chemistry of Solids v 65 n 10 October 2004 2004.p 1745-1750
 CODEN: JPCSAW ISSN: 0022-3697
 PY 2004
 DT Journal
 TC Experimental
 LA English
 AB The work is concerned with modification of C/C composites by

intercalation of **copper** chloride. The samples of composites were made from **graphite** fibres and carbon matrix derived from **mesophase pitch** and from phenol-formaldehyde resin. The samples were prepared by impregnating **graphite** fibres with a liquid **pitch** or polymer solution to obtain unidirectional laminates. The laminates were used to prepare the composites which were then subjected to carbonization and graphitization up to 2150deg C. The work discusses the problem relevant to the effect of intercalation on mechanical and electrical properties of composites. The studies indicated that both **mesophase pitch**-based composites and phenolic-derived carbon-carbon composites changed their electrical and mechanical properties upon intercalation with **copper** chloride. Electrical conductivity of both types of composites decreased as a result of the damages formed during intercalation. \$CPY 2004 Elsevier Ltd. All rights reserved. 17 Refs.

CC 415.4 Other Structural Materials; 701.1 Electricity: Basic Concepts and Phenomena; 704.1 Electric Components; 801.4.1 Electrochemistry; 802.2 Chemical Reactions
CT *Carbon carbon composites; **Electrodes**; Electrochemistry; Mechanical properties; Graphitization; Electric conductivity; Carbonization; Intercalation compounds
ST Gaseous precursors; Electrochemical devices; Acceptor molecules

L35 ANSWER 7 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN

AN 2003:773819 HCAPLUS

DN 139:294631

ED Entered STN: 03 Oct 2003

TI Lithium ion secondary battery showing good charge-discharge cycle characteristics

IN Nishikawa, Reiji; Yoda, Kiyoto; Suzuki, Masami; Shikoda, Masataka

PA Toshiba Battery Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 5 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01M010-40

ICS H01M004-48; H01M004-62

CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2003282147	A2	20031003	JP 2002-86994	20020326

PRAI JP 2002-86994 20020326

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2003282147	ICM	H01M010-40
	ICS	H01M004-48; H01M004-62
	IPCI	H01M0010-40 [ICM,7]; H01M0004-48 [ICS,7]; H01M0004-62 [ICS,7]

AB The title battery is equipped with: an anode which contains niobium pentaoxide, electroconductive materials, and a binder; **cathode** which carbon material electrochem. binding and releasing lithium and a binder; and nonaq. electrolyte, wherein the electroconductive material of the the anode is made of a mixt. of carbon black chosen from acetylene black, ketjen black, oil black, furnace black and **graphite** chosen from natural

graphite, artificial graphite, expanded
 graphite, mesophase graphite
 pitch, mesophase graphite fiber and
 wherein the binder of cathode is made of a mixt. of rubber
 polymer chosen from SBR, NBR, and MBR and cellulose or CMC or
 polyacrylic acid deriv. chosen from polyacrylic acid, ammonium
 polyacrylate, and lithium polyacrylate. The battery shows excellent
 properties on the charge-discharge cycle.
 lithium ion secondary battery
 ST Anodes
 IT Cathodes
 (lithium ion secondary battery)
 IT Carbon black, uses
 Styrene-butadiene rubber, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (lithium ion secondary battery)
 IT Secondary batteries
 (lithium ion; lithium ion secondary battery)
 IT Carbon fibers, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (mesophase pitch-based; lithium ion secondary battery)
 IT 1313-96-8, Niobium pentaoxide 7782-42-5, Graphite, uses
 9003-01-4, Polyacrylic acid
 RL: TEM (Technical or engineered material use); USES (Uses)
 (lithium ion secondary battery)
 IT 9003-55-8
 RL: TEM (Technical or engineered material use); USES (Uses)
 (styrene-butadiene rubber, lithium ion secondary battery)

L35 ANSWER 8 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN
 AN 2002:964681 HCAPLUS
 DN 138:42042
 ED Entered STN: 20 Dec 2002
 TI Improved cathodes for alkaline batteries
 IN Zeng, Shuming
 PA The Gillette Company, USA
 SO PCT Int. Appl., 32 pp.
 CODEN: PIXXD2
 DT Patent
 LA English
 IC ICM H01M004-62
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy
 Technology)

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2002101856	A2	20021219	WO 2002-US17746	20020606
WO 2002101856	A3	20040401		
W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW			
RW:	GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG			
US 2003008211	A1	20030109	US 2001-880651	

200106
13

US 6596438 B2 20030722
EP 1425812 A2 20040609 EP 2002-739693

200206
06

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,
PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR

BR 2002010308 A 20040928 BR 2002-10308

200206
06

JP 2005518633 T2 20050623 JP 2003-504491

200206
06

PRAI US 2001-880651 A1 20010613
WO 2002-US17746 W 20020606

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
WO 2002101856	ICM	H01M004-62
	IPCI	H01M0004-62 [ICM,7]
US 2003008211	IPCI	H01M0004-62 [ICM,7]; H01M0004-50 [ICS,7]; H01M0004-42 [ICS,7]; H01M0010-26 [ICS,7]
	NCL	429/229.000
EP 1425812	IPCI	H01M0004-62 [ICM,7]
BR 2002010308	IPCI	H01M0004-62 [ICM,7]
JP 2005518633	IPCI	H01M0006-08 [ICM,7]; H01M0004-50 [ICS,7]; H01M0004-62 [ICS,7]
	FTERM	5H024/AA03; 5H024/AA14; 5H024/BB01; 5H024/CC02; 5H024/DD17; 5H024/EE03; 5H024/FF08; 5H024/HH00; 5H024/HH01; 5H024/HH11; 5H024/HH13; 5H050/AA02; 5H050/AA12; 5H050/BA03; 5H050/CA05; 5H050/CB13; 5H050/DA10; 5H050/EA09; 5H050/FA07; 5H050/FA16; 5H050/GA02; 5H050/HA01; 5H050/HA04; 5H050/HA07; 5H050/HA13; 5H050/HA14
AB		The title battery has a cathode comprising manganese dioxide and graphitized carbon fibers with an av. BET surface area of 10-60 m ² /g. Optionally, graphitized mesophase pitch-based carbon fibers can be used instead of graphitized carbon fibers. The graphitized mesophase pitch-based carbon fibers may be heat treated at 800-1200° with KOH. The use of graphitized carbon fibers in the cathode increases cathode cond. and results in improved battery performance.
ST		battery alk graphitized carbon fiber cathode; graphitized mesophase pitch based carbon fiber cathode battery
IT		Battery cathodes Primary batteries (cathodes contg. graphitized carbon fibers for alk. batteries)
IT		Carbon fibers, uses RL: DEV (Device component use); USES (Uses) (graphite, mesophase pitch-based, TA 1F, DKE-X, 42C, 42D, LB 3F; cathodes contg. graphitized carbon fibers for alk. batteries)
IT		Carbon fibers, uses RL: DEV (Device component use); USES (Uses) (graphite; cathodes contg. graphitized carbon fibers for alk. batteries)
IT		7782-42-5, Graphite, uses RL: DEV (Device component use); USES (Uses) (DCN 2, MP 0702X; cathodes contg. graphitized carbon fibers and flaky cryst. or expanded graphite for alk. batteries)
IT		7440-66-6, Zinc, uses

RL: DEV (Device component use); USES (Uses)
 (anode; cathodes contg. graphitized carbon fibers for alk.
 batteries with)
 IT 1310-58-3, Potassium hydroxide (KOH), uses
 RL: DEV (Device component use); NUU (Other use, unclassified); USES
 (Uses)
 (electrolyte and heat treating agent; cathodes contg. graphitized
 carbon fibers for alk. batteries)
 IT 1313-13-9, Manganese dioxide, uses
 RL: DEV (Device component use); USES (Uses)
 (electrolytic, cathode; cathodes contg. graphitized carbon fibers
 for alk. batteries)

L35 ANSWER 9 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN
 AN 2002:172340 HCAPLUS
 DN 136:202906
 ED Entered STN: 08 Mar 2002
 TI Processes for producing coke, artificial graphite and carbon
 material for negative **electrode** of non-aqueous solvent
 type secondary battery and pitch composition used therefor
 IN Kanno, Koichi; Tsuruya, Hirotaka; Fujiura, Ryuji
 PA Japan
 SO U.S. Pat. Appl. Publ., 6 pp.
 CODEN: USXXCO

DT Patent
 LA English
 IC ICM C10B047-00
 ICS C10G001-00
 INCL 201001000
 CC 51-10 (Fossil Fuels, Derivatives, and Related Products)
 Section cross-reference(s): 52, 57

FAN.CNT 1	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2002027066	A1	20020307	US 2001-923373	20010808
	JP 2002083595	A2	20020322	JP 2000-270315	20000906
	EP 1186646	A2	20020313	EP 2001-119188	20010809
	EP 1186646	A3	20030502		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
PRAI	JP 2000-270315	A	20000906		

CLASS	PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
	US 20020027066	ICM	C10B047-00
		ICS	C10G001-00
		INCL	201001000
		IPCI	C10B0047-00 [ICM,7]; C10G0001-00 [ICS,7]
		NCL	201/001.000
		ECLA	C01B031/04; C10B055/00; H01M004/58E2
	JP 2002083595	IPCI	H01M0004-58 [ICM,7]; C01B0031-00 [ICS,7]; C01B0031-04 [ICS,7]; C10B0057-04 [ICS,7]; C10C0003-02 [ICS,7]; H01M0004-02 [ICS,7]; H01M0010-40 [ICS,7]
	EP 1186646	IPCI	C10C0003-00 [ICM,6]; C10B0055-00 [ICS,6];

C01B0031-04 [ICS,6]; H01M0004-58 [ICS,6];
 H01M0010-40 [ICS,6]
 ECLA C01B031/04; C10B055/00; H01M004/58E2
 AB When a pitch compn., prepd. by mixing 100 wt. parts of
 mesophase pitch with 10-1,000 wt. parts of
 coal-tar pitch, is heat-treated at $\geq 500^\circ$, it
 is possible to produce a high-d. coke at a high yield while avoiding
 foaming of the mesophase pitch. In addn., when
 the coke is graphitized at $\geq 2,000^\circ$, it is possible to
 obtain an artificial graphite having a high graphitization
 degree. Further, when the coke is first pulverized and then
 graphitized at $\geq 2,000^\circ$, it is possible to obtain a
 high-crystallinity graphite powder which can be suitably
 used as a C material for a neg. electrode of non-aq.
 solvent type secondary battery having a high discharge capacity and
 a high charge-discharge efficiency.
 ST coke manuf pitch; graphitization pitch coke; battery anode graphite
 manuf
 IT Fluoropolymers, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (as binder in manuf. of graphite anodes)
 IT Coal tar pitch
 Mesophase pitch
 (in pitch coke manuf)
 IT Battery anodes
 (manuf. from graphitized pitch coke)
 IT Graphitization
 (of pitch coke)
 IT Coke
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical
 process); PROC (Process)
 (pitch; manuf. from mesophase pitch and coal-tar pitch)
 IT 24937-79-9, Polyvinylidene fluoride
 RL: TEM (Technical or engineered material use); USES (Uses)
 (as binder in manuf. of graphite anodes)
 IT 91-20-3, Naphthalene, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (in manuf. of mesophase pitch)
 IT 7782-42-5P, Graphite, preparation
 RL: IMF (Industrial manufacture); PEP (Physical, engineering or
 chemical process); PYP (Physical process); PREP (Preparation); PROC
 (Process)
 (manuf. from pitch coke)

L35 ANSWER 10 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN
 AN 2004:924152 HCAPLUS
 DN 142:159400
 ED Entered STN: 03 Nov 2004
 TI Organic electrolytes for secondary lithium batteries with
 carbon-based anodes
 IN Do, Chil Hun; Mun, Seong In
 PA Il Dong Chemical Co., Ltd., S. Korea; Korea Electro Technology
 Research Institute
 SO Repub. Korean Kongkae Taeho Kongbo, No pp. given
 CODEN: KRXXA7
 DT Patent
 LA Korean
 IC ICM H01M004-36
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy
 Technology)

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI KR 2002048814 A 20020624 KR 2000-78088 20001218

PRAI KR 2000-78088

20001218

CLASS

PATENT NO. CLASS PATENT FAMILY CLASSIFICATION CODES

KR 2002048814 ICM H01M004-36
IPCI H01M0004-36 [ICM,7]

AB This org. electrolytic soln. consists of EC and PC for a Li battery with a **graphite**-based C anode. The battery has enhanced output power and increased energy d. due to a decrease in the irreversible sp. capacity of the assistant C **electrode**. The soln. consists of 0.8-33 vol.% propylene carbonate, 43-29 vol.% ethylene carbonate, and 56-38 vol.% di-Et carbonate, di-Me carbonate, ethyl-Me carbonate and methyl-Pr carbonate; and Li salt at 0.7-1.3M. When **mesophase** carbon microbeads (MCMB) is used as anode material, the electrolytic soln. comprises 0.8-20 vol.% PC, 45-35 vol.% EC, 56-45 vol.% di-Et carbonate. When the **pitch** coated **graphite** (PCG) is used as the anode material, the electrolytic soln. comprises 0.8-15 vol.% PC, 43-37 vol.% EC, 56-48 vol.% di-Et carbonate. When the hard C is used as the anode material, the electrolytic soln. comprises 0.8-20 vol.% PC, 45-35 vol.% EC, 56-45 vol.% di-Et carbonate.

ST org electrolyte carbon graphite anode lithium battery

IT Secondary batteries
(lithium; org. electrolytes for secondary lithium batteries with carbon-based anodes)

IT Battery anodes
Battery electrolytes
(org. electrolytes for secondary lithium batteries with carbon-based anodes)

IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate
108-32-7, Propylene carbonate 616-38-6, Dimethyl carbonate
623-53-0, Ethyl-methyl carbonate 7440-44-0, Carbon, uses
7782-42-5, Graphite, uses 56525-42-9, Methyl-propyl carbonate
RL: DEV (Device component use); USES (Uses)
(org. electrolytes for secondary lithium batteries with carbon-based anodes)

L35 ANSWER 11 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN

AN 2004:913949 HCAPLUS

DN 142:97410

ED Entered STN: 01 Nov 2004

TI Coating of carbon cathode material for lithium secondary batteries

IN Han, Sang Cheol; Han, Yeong Su; Kang, Yong Muk; Lee, Jae Yeong;
Park, Seong Cheol

PA Korea Advanced Institute of Science and Technology, S. Korea

SO Repub. Korean Kongkae Taeho Kongbo, No pp. given
CODEN: KRXXA7

DT Patent

LA Korean

IC ICM H01M004-02

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1
PATENT NO. KIND DATE APPLICATION NO. DATE

PI KR 2002010843 A 20020206 KR 2000-44367

200007
31

PRAI KR 2000-44367

20000731

CLASS

PATENT NO. CLASS PATENT FAMILY CLASSIFICATION CODES

KR 2002010843 ICM H01M004-02
IPCI H01M0004-02 [ICM,7]

AB This method for coating a highly cryst. C cathode material confers excellent surface characteristics which provides a battery with high energy d. and good performance. The highly cryst. C is coated with a pyrolytic C by pyrolysis of a hydrocarbon gas by tumbling CVD. The cryst. C material is selected from natural graphite, Kish graphite, SFG series, highly oriented pyrolytic graphite, mesophase pitch based C fiber (MPCF), and MCMB series and the hydrocarbon gas is selected from LPG, methane, butane, and benzene.

ST carbon cathode pyrolytic carbon coating lithium battery

IT Petroleum products
(gases, liquefied; in pyrolytic carbon coating of carbon-based cathode material for lithium secondary batteries)

IT Secondary batteries
(lithium; pyrolytic carbon coating of carbon-based cathode material for lithium secondary batteries)

IT Carbon fibers, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(mesophase pitch-based; pyrolytic carbon coating of carbon-based cathode material for lithium secondary batteries)

IT Battery cathodes
(pyrolytic carbon coating of carbon-based cathode material for lithium secondary batteries)

IT 71-43-2, Benzene, processes 74-82-8, Methane, processes
106-97-8, Butane, processes
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
(in pyrolytic carbon coating of carbon-based cathode material for lithium secondary batteries)

IT 7440-44-0, Carbon, uses 7782-42-5, Graphite, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(pyrolytic carbon coating of carbon-based cathode material for lithium secondary batteries)

L35 ANSWER 12 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN

AN 2002:773879 HCAPLUS

DN 137:297338

ED Entered STN: 11 Oct 2002

TI Nonaqueous electrolyte secondary battery

IN Ota, Hideo; Kishi, Takashi

PA Toshiba Corp., Japan

SO Jpn. Kokai Tokkyo Koho, 10 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01M010-40

ICS H01M010-40; H01M004-02; H01M004-58

CC 52-1 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 76

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI JP 2002298915	A2	20021011	JP 2001-98184	

200103
30

PRAI JP 2001-98184

20010330

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2002298915	ICM	H01M010-40
	ICS	H01M010-40; H01M004-02; H01M004-58
	IPCI	H01M0010-40 [ICM,7]; H01M0010-40 [ICS,7]; H01M0004-02 [ICS,7]; H01M0004-58 [ICS,7]
AB		The battery is characterized by having good discharge capacity, charging cycle life time, and is capable of avoiding cracking, firing, and sudden temp. increase when large elec. current occurs during nail sticking short circuit test. The battery comprises a pos. electrode having active material contg. lithium oxide and ≥ 1 metals selected from Al, Co, Fe, Mn, Ga, Ru, and Nb, a neg. electrode , and a nonaq. electrolyte substrate contg. phosphate ester and vinylene carbonate (such as ethylene carbonate and methylethyl carbonate).
ST		nonaq electrolyte secondary battery active material
IT		Esters, uses RL: DEV (Device component use); USES (Uses) (Phosphate; nonaq. electrolyte secondary battery using phosphate ester and vinylene carbonate)
IT		Mesophase pitch Secondary batteries (nonaq. electrolyte secondary battery using phosphate ester and vinylene carbonate)
IT		Carbon black, uses Carbon fibers, uses Fluoropolymers, uses RL: TEM (Technical or engineered material use); USES (Uses) (nonaq. electrolyte secondary battery using phosphate ester and vinylene carbonate)
IT		78-40-0, Triethyl phosphate 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate 512-56-1, Trimethyl phosphate 616-38-6, Dimethyl carbonate 623-53-0, Methylethylcarbonate 872-36-6, Vinylene carbonate 10463-05-5, Dimethylethylphosphate RL: TEM (Technical or engineered material use); USES (Uses) (nonaq. electrolyte secondary battery prepn.; nonaq. electrolyte secondary battery using phosphate ester and vinylene carbonate)
IT		12057-24-8, Lithium oxide, uses RL: DEV (Device component use); USES (Uses) (nonaq. electrolyte secondary battery using phosphate ester and vinylene carbonate)
IT		7439-96-5, Manganese, uses 7440-03-1, Niobium, uses 7440-18-8, Ruthenium, uses 7440-48-4, Cobalt, uses 7440-55-3, Gallium, uses RL: MOA (Modifier or additive use); TEM (Technical or engineered material use); USES (Uses) (nonaq. electrolyte secondary battery using phosphate ester and vinylene carbonate)
IT		7429-90-5, Aluminum, uses 7440-02-0, Nickel, uses 7440-50-8, Copper, uses 7782-42-5, Graphite, uses 9002-88-4, Polyethylene 24937-79-9, Polyvinylidene fluoride RL: TEM (Technical or engineered material use); USES (Uses) (nonaq. electrolyte secondary battery using phosphate ester and vinylene carbonate)

L35 ANSWER 13 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2002:253368 HCAPLUS
DN 136:265837

ED Entered STN: 05 Apr 2002
 TI Graphite material for secondary lithium battery anode and its
 manufacture
 IN Okamura, Kaichiro; Takai, Yasuyuki; Sudo, Yoshinori
 PA Petoca Ltd., Japan
 SO Jpn. Kokai Tokkyo Koho, 8 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 IC ICM H01M004-58
 ICS C01B031-04; H01M004-02; H01M010-40
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy
 Technology)

FAN.CNT 1	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2002100359	A2	20020405	JP 2000-291916	200009 26

PRAI JP 2000-291916 20000926

CLASS	PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
	JP 2002100359	ICM	H01M004-58
		ICS	C01B031-04; H01M004-02; H01M010-40
		IPCI	H01M0004-58 [ICM,7]; C01B0031-04 [ICS,7]; H01M0004-02 [ICS,7]; H01M0010-40 [ICS,7]

AB The **graphite** has $d_{002} \leq 0.336$ nm, $L_c \geq 100$ nm,
 $L_a \geq 100$ nm, and $I_{100}/I_{101} > 1.6$ [I_{100} and I_{101} are the
 intensities of diffraction peaks for its (100) and (101) faces] on
 its x ray diffraction pattern. The **graphite** material is
 prepd. by directly heating milled **mesophase pitch**
 derived carbon fibers, by applying a current through the fibers via
 a pair of **electrodes**, in a fluidized bed furnace with a
 controlled atm.

ST lithium battery anode graphite manuf carbon fiber; cryst
 characteristic graphite secondary lithium battery anode

IT Battery anodes
 (cryst. structure and manuf. of graphite from carbon fibers for
 secondary lithium battery anodes)

IT Carbon fibers, processes
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical
 process); PROC (Process)
 (milled mesophase pitch derived carbon fibers for manuf. of
 graphite for secondary lithium battery anodes)

IT 7782-42-5P, Graphite, uses
 RL: DEV (Device component use); IMF (Industrial manufacture); PREP
 (Preparation); USES (Uses)
 (cryst. structure and manuf. of graphite from carbon fibers for
 secondary lithium battery anodes)

L35 ANSWER 14 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN

AN 2002:183906 HCAPLUS

DN 136:234637

ED Entered STN: 15 Mar 2002

TI Nonaqueous electrolyte secondary battery for portable electronic
 appliances

IN Satoh, Asako; Fujiwara, Masashi; Koiwa, Kaoru; Sekino, Masahiro;
 Shimura, Nao; Hasebe, Hiroyuki; Oguchi, Masayuki; Onumai, Masayuki

PA Kabushiki Kaisha Toshiba, Japan

SO Eur. Pat. Appl., 39 pp.

CODEN: EPXXDW
 DT Patent
 LA English
 IC ICM H01M010-40
 ICS H01M004-58
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1187245	A2	20020313	EP 2001-307571	20010906
	EP 1187245	A3	20040421		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
	US 2002055047	A1	20020509	US 2001-945808	20010905
	US 6852451	B2	20050208		
	JP 2002329529	A2	20021115	JP 2001-269299	20010905
	CN 1343022	A	20020403	CN 2001-132683	20010906
PRAI	JP 2000-270529	A	20000906		
	JP 2001-54938	A	20010228		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
EP 1187245	ICM	H01M010-40
	ICS	H01M004-58
	IPCI	H01M0010-40 [ICM,6]; H01M0004-58 [ICS,6]
	ECLA	H01M004/58E2; H01M010/40L2
US 2002055047	IPCI	H01M0010-40 [ICM,7]; H01M0002-02 [ICS,7]
	NCL	429/337.000
	ECLA	H01M004/58E2; H01M010/40L2
JP 2002329529	IPCI	H01M0010-40 [ICM,7]; H01M0010-40 [ICS,7]; H01M0002-02 [ICS,7]; H01M0004-02 [ICS,7]; H01M0004-58 [ICS,7]
CN 1343022	IPCI	H01M0010-36; H01M0010-40

AB Disclosed is a nonaq. electrolyte secondary battery, comprising a case having a wall thickness not larger than 0.3 mm, a pos. **electrode** provided in the case, a neg. **electrode** provided in the case and the neg. **electrode** contg. a carbonaceous material capable of absorbing-desorbing lithium ions, and a nonaq. electrolyte provided in the case and the nonaq. electrolyte contg. a nonaq. solvent including γ -butyrolactone and a solute dissolved in the nonaq. solvent, wherein after being discharged to 3-V with a current of 0.2-C at room temp., the voltage redn. caused by the self-discharge at 60° is not larger than 1.5 V in 3 wk.

ST battery nonaq electrolyte portable electronic appliance use

IT Carbon fibers, uses

RL: DEV (Device component use); USES (Uses)
 (mesophase pitch-based; nonaq. electrolyte secondary battery for portable electronic appliances)

IT Electric apparatus
 Secondary batteries
 (nonaq. electrolyte secondary battery for portable electronic appliances)

IT Carbonaceous materials (technological products)
 RL: DEV (Device component use); USES (Uses)
 (nonaq. electrolyte secondary battery for portable electronic appliances)

IT Carbon black, uses
 Fluoropolymers, uses
 RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)
 (nonaq. electrolyte secondary battery for portable electronic appliances)

IT **Mesophase pitch**
 (precursor for carbonaceous material; nonaq. electrolyte secondary battery for portable electronic appliances)

IT 96-49-1, Ethylene carbonate 7429-90-5, Aluminum, uses
7440-50-8, Copper, uses 9002-88-4, Polyethylene
 12190-79-3, Cobalt lithium oxide colio2 14283-07-9, Lithium tetrafluoroborate
 RL: DEV (Device component use); USES (Uses)
 (nonaq. electrolyte secondary battery for portable electronic appliances)

IT 96-48-0, γ -Butyrolactone **7782-42-5, Graphite**
 , uses 24937-79-9, PvdF
 RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)
 (nonaq. electrolyte secondary battery for portable electronic appliances)

IT 7439-93-2, Lithium, uses
 RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
 (nonaq. electrolyte secondary battery for portable electronic appliances)

IT 872-50-4, n-Methylpyrrolidone, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (nonaq. electrolyte secondary battery for portable electronic appliances)

L35 ANSWER 15 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN
 AN 2002:811781 HCAPLUS
 DN 137:327379
 ED Entered STN: 25 Oct 2002
 TI Continuous production of trilaminates by coextrusion for polymer lithium batteries
 IN Naarmann, Herbert; Kruger, Franz Josef; Schaefer, Tim
 PA Dilo Trading A.-G., Switz.
 SO Ger. Offen., 10 pp.
 CODEN: GWXXBX
 DT Patent
 LA German
 IC ICM H01M010-38
 ICS H01M010-40
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 38

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	DE 10118639	A1	20021024	DE 2001-10118639	20010412
PRAI	DE 2001-10118639		20010412		
CLASS					

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
DE 10118639	ICM	H01M010-38
	ICS	H01M010-40
	IPCI	H01M0010-38 [ICM,7]; H01M0010-40 [ICS,7]
	ECLA	H01M010/38; H01M010/40L2
AB	<p>The invention concerns the prodn. of Trilaminates, consisting of an anode composite, polymer electrolytes and a cathode composite, which are provided on the cathode side and on the anode side with a metallic grid. The prodn. is carried out continuously, preferably via coextrusion. The systems thus obtained form the basis for rechargeable polymer lithium batteries. The procedure according to invention contains the prodn. of anode masses, cathode material as well as the polymer gel electrolyte, which are: (1) homogeneously developed, (2) agree in structural viscosity and rheol., and (3) defined in shape by extrusion; and can be continuously formed as bands with reproducible wts. and laminated. The anode mass consists of graphite, preferably synthetic, e.g., mesocarbon microbeads with spherical particles or graphite fibers as well as a polymer binder e.g. polyfluoroelastomeres, polyolefins, polybutadiene or styrene copolymers, as well as polymethacrylates with alc. residues C4-C20, and polyvinyl compds. such as polyvinylpyrrolidone, polyvinylimidazole, polyvinylpyridin etc. and their copolymers, e.g. with methacrylic acid ester with alc. residues C4-C20, and a conducting salt e.g., LiPF6 or Li oxalato borates, etc.</p>	
ST	lithium secondary battery polymer trilate coextrusion	
IT	<p>Battery anodes Battery cathodes Extrusion of plastics and rubbers Laminated materials (continuous prodn. of trilaminates by coextrusion for polymer lithium batteries)</p>	
IT	<p>Fluoro rubber Isoprene-styrene rubber Polyolefins RL: DEV (Device component use); USES (Uses) (continuous prodn. of trilaminates by coextrusion for polymer lithium batteries)</p>	
IT	<p>Zeolites (synthetic), uses RL: MOA (Modifier or additive use); USES (Uses) (continuous prodn. of trilaminates by coextrusion for polymer lithium batteries)</p>	
IT	<p>Carbon fibers, uses RL: DEV (Device component use); USES (Uses) (graphite; continuous prodn. of trilaminates by coextrusion for polymer lithium batteries)</p>	
IT	<p>Secondary batteries (lithium; continuous prodn. of trilaminates by coextrusion for polymer lithium batteries)</p>	
IT	<p>Battery electrolytes (polymer gel; continuous prodn. of trilaminates by coextrusion for polymer lithium batteries)</p>	
IT	<p>96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate 7782-42-5, Graphite, uses 7791-03-9, Lithium perchlorate 9003-17-2, Polybutadiene 9003-39-8, Polyvinylpyrrolidone 9003-47-8, Polyvinylpyridine 9003-53-6, Polystyrene 12031-65-1, Lithium nickel oxide linio2 12057-17-9, Lithium manganese oxide limn2o4 12190-79-3, Cobalt lithium oxide colio2 14283-07-9, Lithium tetrafluoroborate 21324-40-3, Lithium hexafluorophosphate 25087-26-7D, Polymethacrylic acid, alkyl esters, with C4-20 alcs.</p>	

25232-42-2, Polyvinylimidazole 33454-82-9, Lithium triflate
 37296-91-6, Lithium molybdenum oxide 37349-20-5, Lithium tungsten
 oxide 39302-37-9, Lithium titanium oxide 473540-08-8
 RL: DEV (Device component use); USES (Uses)
 (continuous prodn. of trilaminates by coextrusion for polymer
 lithium batteries)

IT 7631-86-9, Silica, uses 9011-17-0, Kynar 2801
 RL: MOA (Modifier or additive use); USES (Uses)
 (continuous prodn. of trilaminates by coextrusion for polymer
 lithium batteries)

IT 25038-32-8
 RL: DEV (Device component use); USES (Uses)
 (isoprene-styrene rubber, continuous prodn. of trilaminates by
 coextrusion for polymer lithium batteries)

IT 7440-44-0, Carbon, uses
 RL: DEV (Device component use); USES (Uses)
 (mesocarbon microbeads; continuous prodn. of trilaminates by
 coextrusion for polymer lithium batteries)

RE.CNT 1 THERE ARE 1 CITED REFERENCES AVAILABLE FOR THIS RECORD
 RE
 (1) Anon; DE 10020031 A1 HCAPLUS

L35 ANSWER 16 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN DUPLICATE 2
 AN 2002:719538 HCAPLUS
 DN 138:58831
 ED Entered STN: 23 Sep 2002
 TI Morphology/Behavior Relationship in Reversible Electrochemical
 Lithium Insertion into Graphitic Materials
 AU Aurbach, Doron; Teller, Hanan; Levi, Elena
 CS Department of Chemistry, Bar-Ilan University, Ramat-Gan, 52900,
 Israel
 SO Journal of the Electrochemical Society (2002), 149(10), A1255-A1266
 CODEN: JESQAN; ISSN: 0013-4651
 PB Electrochemical Society
 DT Journal
 LA English
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 66, 72
 AB Different types of **graphite** particles, including
synthetic flakes, natural **graphite** flakes,
spherical graphite particles (mesocarbon
 microbeads), and combinations of graphite flakes and disordered C
 particles were studied as **electrode** materials in Li
 insertion/deinsertion processes. The morphol. of the graphite
 particles plays an important role in their stability. One of the
 key factors is the structure of the facets perpendicular to the
 basal planes, through which Li insertion takes place. The smoother
 these facets are, and the less crevices they contain, the more
 stable are the graphite particles in Li insertion reactions. This
 is attributed to the fact that the surface reactions on the
 cathodically polarized graphite **electrodes** in the nonaq.
 Li salt solns. involve gas formation, which may have a detrimental
 effect on the integrity of the graphite particles. Another
 important factor is the existence of some degree of disorder and
 distortion in the graphite structure. More distortion in the
 ordered graphite structure may lead to higher stability. The
 detrimental effect of propylene carbonate in ethylene
 carbonate-based solns. may lead to an explanation of the factors
 that det. stability or destruction of lithiated graphite
electrodes. The correlation between the morphol. of the
 graphite particles and their orientation in practical
electrodes is also discussed. Chronopotentiometry, electron

- microscopy, and x-ray diffraction were used in this study.
- ST graphite electrode morphol failure lithium electrochem insertion; battery graphite anode morphol failure lithium electrochem insertion
- IT Intercalation
(electrochem.; morphol./behavior relationship in reversible electrochem. lithium intercalation into graphitic anode materials for batteries)
- IT Battery anodes
(morphol./behavior relationship in reversible electrochem. lithium intercalation into graphitic anode materials for batteries)
- IT Intercalation
(retro, electrochem.; morphol./behavior relationship in reversible electrochem. lithium intercalation into graphitic anode materials for batteries)
- IT 7782-42-5, Graphite, uses
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(BSP 20, NG 15 and UF 8, synthetic and natural flakes, anodes; morphol./behavior relationship in reversible electrochem. lithium intercalation into graphitic anode materials for batteries)
- IT 7440-44-0, Carbon, uses
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(anodes; morphol./behavior relationship in reversible electrochem. lithium intercalation into graphitic anode materials for batteries)
- IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate 616-38-6, Dimethyl carbonate
RL: CPS (Chemical process); DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(electrolyte contg.; morphol./behavior relationship in reversible electrochem. lithium intercalation into graphitic anode materials for batteries with)
- IT 7791-03-9, Lithium perchlorate (LiClO_4) 21324-40-3, Lithium hexafluorophosphate (LiPF_6)
RL: DEV (Device component use); USES (Uses)
(electrolyte; morphol./behavior relationship in reversible electrochem. lithium intercalation into graphitic anode materials for batteries with)
- IT 7439-93-2, Lithium, processes
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
(morphol./behavior relationship in reversible electrochem. lithium intercalation into graphitic anode materials for batteries)

RE.CNT 35 THERE ARE 35 CITED REFERENCES AVAILABLE FOR THIS RECORD

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- (11) Dahn, J; Lithium Batteries, New Materials, Developments and Perspectives, Chap 1 1994
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- L35 ANSWER 17 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN
- AN 2002:279785 HCAPLUS
- DN 136:372201
- ED Entered STN: 15 Apr 2002
- TI Electrochemical properties of MCMBs as anode for lithium ion battery
- AU Li, Baohua; Guo, Ruixia; Li, Kaixi; Lu, Chunxiang; Ling, Licheng
- CS State Key Laboratory of Coal Conversion, Institute of Coal Chemistry, Chinese Academy of Sciences, Taiyuan, 030001, Peop. Rep. China
- SO Preprints of Symposia - American Chemical Society, Division of Fuel Chemistry (2002), 47(1), 187-188
- CODEN: PSADFZ; ISSN: 1521-4648
- PB American Chemical Society, Division of Fuel Chemistry
- DT Journal
- LA English
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
- AB Mesophase microbeads (MCMBs) prepd. from petroleum pitch or coal tar is one of the candidate carbon materials for the electrodes used to further increase the energy density of lithium secondary batteries. In this regard, the charge and discharge properties of MCMBs with different mean diam. and size distribution were examd. The MCMBs heat-treated at 973 K were found to have a higher reversible capacity than the theor. lithium storage capacity of a graphite anode, suggesting that there is a cavity mechanism for the charge-discharge reaction. The mean diam. and size distribution of MCMBs were found to have an influence on the charge-discharge properties of MCMBs.
- ST mesocarbon microbead anode lithium ion battery
- IT Battery anodes
(electrochem. properties of mesocarbon microbeads as anode for lithium-ion batteries)
- IT 7440-44-0, Carbon, uses
RL: CPS (Chemical process); DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(electrochem. properties of mesocarbon microbeads as anode for

lithium-ion batteries)

RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

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- (7) Pled, E; J Electrochem Soc 1996, V143(1), PL4

L35 ANSWER 18 OF 53 INSPEC (C) 2005 IEE on STN

AN 2002:7407826 INSPEC DN A2002-22-8245-018

TI Morphology/behavior relationship in reversible electrochemical lithium insertion into graphitic materials.

AU Aurbach, D.; Teller, H.; Levi, E. (Dept. of Chem., Bar-Ilan Univ., Ramat-Gan, Israel)

SO Journal of the Electrochemical Society (Oct. 2002) vol.149, no.10, p.A1255-66. 35 refs.

Doc. No.: S0013-4651(02)00110-6

Published by: Electrochem. Soc

Price: CCCC 0013-4651/2002/149(10)/1255/12/\$7.00

CODEN: JESQAN ISSN: 0013-4651

SICI: 0013-4651(200210)149:10L.A1255:MBRR;1-P

DT Journal

TC Experimental

CY United States

LA English

AB Different types of **graphite** particles, including **synthetic** flakes, natural **graphite** flakes, **graphite** fibers, round-shaped **graphite** particles (mesocarbon microbeads), and combinations of graphite flakes and disordered carbon particles were studied as **electrode** materials in lithium insertion/deinsertion processes. We suggest that the morphology of the graphite particles plays an important role in their stability. One of the key factors is the structure of the facets, perpendicular to the basal planes, through which Li insertion takes place. The smoother these facets are, and which contain fewer crevices, the more stable are the graphite particles in Li insertion reactions. This is attributed to the fact that the surface reactions of the cathodically polarized **graphite electrodes** in the nonaqueous Li salt solutions involve gas formation, which may have a detrimental effect on the integrity of the graphite particles. Another important factor is the existence of some degree of disorder and distortion in the graphite structure. More distortion in the ordered graphite structure may lead to higher stability. A clue to the understanding of the factors that determine stability or destruction of lithiated **graphite electrodes** is the pronounced detrimental effect of the presence of propylene carbonate in ethylene carbonate-based solutions, as discussed herein. Another important factor dealt with in this paper is the correlation between the morphology of the graphite particles and their orientation in practical **electrodes**. The major tools for this study included chronopotentiometry, electron microscopy, and X-ray diffraction.

CC A8245 Electrochemistry and electrophoresis; A6865 Low-dimensional structures: growth, structure and nonelectronic properties

CT ELECTROCHEMICAL **ELECTRODES**; ELECTRON MICROSCOPY; GRAPHITE INTERCALATION COMPOUNDS; LITHIUM; X-RAY DIFFRACTION

ST morphology; reversible electrochemical lithium insertion; graphitic material; graphite particles; synthetic flakes; natural graphite flakes; graphite fibers; mesocarbon microbeads; disordered carbon

particles; electrode material; stability; facet structure;
 surface reaction; cathodic polarization; nonaqueous Li salt
 solution; disorder; gas formation; distortion; graphite structure;
 propylene carbonate; ethylene carbonate; particle orientation;
 chronopotentiometry; electron microscopy; X-ray diffraction; C-Li
 CHI CLi bin, Li bin, C bin
 ET Li; C*Li; C-Li; CLi; C cp; cp; Li cp

L35 ANSWER 19 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN
 AN 2001:655019 HCAPLUS
 DN 135:229339
 ED Entered STN: 07 Sep 2001
 TI Nonaqueous electrolyte secondary batteries with uniform discharging
 end voltage
 IN Tatebayashi, Yoshinao; Igasaki, Yoshiyuki; Kanda, Motoshi
 PA Toshiba Corp., Japan
 SO Jpn. Kokai Tokkyo Koho, 9 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 IC ICM H01M004-02
 ICS H01M004-02; H01M004-58; H01M010-40
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy
 Technology)

FAN.CNT 1					
PATENT NO.	KIND	DATE	APPLICATION NO.	DATE	
JP 2001243943	A2	20010907	JP 2000-54589	20000229	
JP 3705728	B2	20051012			
PRAI JP 2000-54589		20000229			

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2001243943	ICM	H01M004-02
	ICS	H01M004-02; H01M004-58; H01M010-40
	IPCI	H01M0004-02 [ICM,7]; H01M0004-02 [ICS,7]; H01M0004-58 [ICS,7]; H01M0010-40 [ICS,7]

AB The batteries comprise (A) cathode active material mixts. contg. Li
 Ni mixed oxides and spinel-type Li Mn oxides and (B) carbonaceous
 anode active material mixts. contg. nongraphitic carbon materials
 and graphite. The blending ratio of the nongraphitic carbon and
 graphite is controlled to keep the discharge potential change rate
 (at the anode operating potential) to ≤ 20 mV/(m-Ah/g). The
 batteries are esp. suitable for their use under serial connection.
 ST nonaq electrolyte secondary battery carbonaceous anode; nongraphitic
 carbon graphite blend battery anode; lithium mixed oxide cathode
 secondary battery; nickel lithium oxide cathode secondary battery;
 manganese lithium oxide cathode secondary battery
 IT Carbon fibers, uses
 RL: DEV (Device component use); USES (Uses)
 (graphite, mesophase pitch-based,
 anodes; nonaq. secondary lithium batteries with lithium mixed
 oxide blended cathodes and nongraphitic carbon-
 graphite blended anodes)
 IT Secondary batteries
 (lithium; nonaq. secondary lithium batteries with lithium mixed
 oxide blended cathodes and nongraphitic carbon-graphite blended
 anodes)
 IT Battery anodes

(nonaq. secondary lithium batteries with lithium mixed oxide blended cathodes and nongraphitic carbon-graphite blended anodes)

IT 7782-42-5, Graphite, uses
 RL: DEV (Device component use); USES (Uses)
 (anode; nonaq. secondary lithium batteries with lithium mixed oxide blended cathodes and nongraphitic carbon-graphite blended anodes)

IT 172922-65-5, Lithium manganese oxide (Li1.06Mn1.94O4) 358751-60-7, Aluminum cobalt lithium nickel oxide (Al0.08Co0.21LiNi0.71O2)
 RL: DEV (Device component use); USES (Uses)
 (cathode; nonaq. secondary lithium batteries with lithium mixed oxide blended cathodes and nongraphitic carbon-graphite blended anodes)

IT 7440-44-0, Carbon, uses
 RL: DEV (Device component use); USES (Uses)
 (nongraphitic, anode; nonaq. secondary lithium batteries with lithium mixed oxide blended cathodes and nongraphitic carbon-graphite blended anodes)

L35 ANSWER 20 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN

AN 2001:85650 HCAPLUS

DN 134:149864

ED Entered STN: 06 Feb 2001

TI Method for treatment of meso-phase pitch to produce carbonaceous material for graphite used in battery **electrode**

IN Hatano, Hitomi; Nagayama, Katsuhiko; Eguchi, Kunihiro; Fukuda, Tsuneyoshi; Yutani, Satoshi

PA Kawasaki Steel Corp., Japan

SO Jpn. Kokai Tokkyo Koho, 8 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM C10C003-02

ICS C01B031-00; C01B031-02; C01B031-04; C10C003-08; H01M004-04

CC 51-19 (Fossil Fuels, Derivatives, and Related Products)

Section cross-reference(s): 52, 57

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2001031976	A2	20010206	JP 1999-208371	19990723

PRAI JP 1999-208371 19990723

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2001031976	ICM	C10C003-02
	ICS	C01B031-00; C01B031-02; C01B031-04; C10C003-08; H01M004-04
	IPCI	C10C0003-02 [ICM,7]; C01B0031-00 [ICS,7]; C01B0031-02 [ICS,7]; C01B0031-04 [ICS,7]; C10C0003-08 [ICS,7]; H01M0004-04 [ICS,7]

AB The method is carried out by extn. and removal of light components (e.g., pyridine) from pitch contg. meso-phase phase (obtained from polymn. of condensed polycyclic arom. hydrocarbon in the presence of catalyst) using cyclic compd. and/or polycyclic arom. hydrocarbon. The treated meso-phase pitch is further under thermal treatment at 450° for 3 h to obtain carbonaceous material suitable for manufg. graphite as electrode material in Li secondary battery.

ST carbonaceous material **graphite** hydrocarbon

- mesophase pitch; battery electrode**
graphite pitch treatment
- IT Polycyclic compounds
 RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
 (arom. hydrocarbons; method for treatment of meso-phase pitch to produce carbonaceous material for graphite used in battery electrode)
- IT Battery electrodes
 Graphitization
Mesophase pitch
 Polymerization catalysts
 Secondary batteries
 (method for treatment of meso-phase pitch to produce carbonaceous material for graphite used in battery electrode)
- IT Carbonaceous materials (technological products)
 RL: FMU (Formation, unclassified); NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); FORM (Formation, nonpreparative); PROC (Process); USES (Uses)
 (method for treatment of meso-phase pitch to produce carbonaceous material for graphite used in battery electrode)
- IT Cyclic compounds
 RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
 (method for treatment of meso-phase pitch to produce carbonaceous material for graphite used in battery electrode)
- IT Aromatic hydrocarbons, uses
 RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
 (polycyclic; method for treatment of meso-phase pitch to produce carbonaceous material for graphite used in battery electrode)
- IT 7637-07-2, Boron fluoride (BF₃), uses 7664-39-3, Hydrogen fluoride, uses
 RL: CAT (Catalyst use); NUU (Other use, unclassified); USES (Uses)
 (method for treatment of meso-phase pitch to produce carbonaceous material for graphite used in battery electrode)
- IT 7782-42-5P, Graphite, uses
 RL: DEV (Device component use); IMF (Industrial manufacture); NUU (Other use, unclassified); PREP (Preparation); USES (Uses)
 (method for treatment of meso-phase pitch to produce carbonaceous material for graphite used in battery electrode)
- IT 91-20-3, Naphthalene, processes
 RL: PEP (Physical, engineering or chemical process); PROC (Process)
 (method for treatment of meso-phase pitch to produce carbonaceous material for graphite used in battery electrode)
- IT 110-86-1, Pyridine, processes
 RL: PEP (Physical, engineering or chemical process); REM (Removal or disposal); PROC (Process)
 (method for treatment of meso-phase pitch to produce carbonaceous material for graphite used in battery electrode)
- L35 ANSWER 21 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN
 AN 2001:152411 HCAPLUS
 DN 134:181116
 ED Entered STN: 02 Mar 2001
 TI Flat nonaqueous electrolyte secondary battery with improvements in heavy loading discharge characteristics
 IN Suzuki, Masami; Hayami, Muneto; Udagawa, Kazuo; Iiduka, Kazuo; Ishihara, Naomi; Hirahara, Satoshi; Sakai, Hirotaka; Yoda, Kiyoto; Shikota, Masataka
 PA Toshiba Battery Co., Ltd., Japan

SO Eur. Pat. Appl., 51 pp.
 CODEN: EPXXDW
 DT Patent
 LA English
 IC ICM H01M010-40
 ICS H01M002-02; H01M010-04
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 55

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1079454	A2	20010228	EP 2000-117368	20000823
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
JP 2001068160	A2	20010316	JP 1999-240964	19990827
JP 2001068143	A2	20010316	JP 1999-241290	19990827
JP 2001143763	A2	20010525	JP 1999-327679	19991118
JP 2002008729	A2	20020111	JP 2000-183000	20000619
JP 2002008727	A2	20020111	JP 2000-183001	20000619
TW 504854	B	20021001	TW 2000-89116426	20000815
US 6521373	B1	20030218	US 2000-641267	20000817
HK 1035605	A1	20050916	HK 2001-106014	20010827
US 2003138693	A1	20030724	US 2002-318177	20021213
US 2005271938	A1	20051208	US 2005-176400	20050708
PRAI JP 1999-240964	A	19990827		
JP 1999-241290	A	19990827		
JP 1999-327679	A	19991118		
JP 2000-183000	A	20000619		
JP 2000-183001	A	20000619		
US 2000-641267	A3	20000817		
US 2002-318177	A3	20021213		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
EP 1079454	ICM	H01M010-40
	ICS	H01M002-02; H01M010-04
	IPC	H01M0010-40 [ICM,6]; H01M0002-02 [ICS,6]; H01M0010-04 [ICS,6]
	ECLA	H01M002/02B6B2; H01M002/02E2C; H01M002/12D2;

H01M010/04C2; H01M010/40L2

JP 2001068160 IPCI H01M0010-40 [ICM,7]

JP 2001068143 IPCI H01M0010-04 [ICM,7]; H01M0004-02 [ICS,7];
H01M0004-58 [ICS,7]; H01M0010-40 [ICS,7]

JP 2001143763 IPCI H01M0010-40 [ICM,7]; H01M0002-04 [ICS,7];
H01M0002-08 [ICS,7]; H01M0004-02 [ICS,7]

JP 2002008729 IPCI H01M0010-40 [ICM,7]; H01M0004-64 [ICS,7];
H01M0004-74 [ICS,7]

JP 2002008727 IPCI H01M0010-40 [ICM,7]

TW 504854 IPCI H01M0006-14 [ICM,7]; H01M0010-38 [ICS,7];
H01M0002-00 [ICS,7]

US 6521373 IPCI H01M0006-46 [ICM,7]

NCL 429/162.000; 429/094.000; 429/124.000;
429/127.000

ECLA H01M002/02B6B2; H01M002/02E2C; H01M002/12D2;
H01M010/04C2; H01M010/40L2

HK 1035605 IPCI H01M [ICM,7]

US 2003138693 IPCI H01M0002-02 [ICM,7]; H01M0002-08 [ICS,7];
H01M0004-58 [ICS,7]; H01M0010-40 [ICS,7];
H01M0004-66 [ICS,7]

NCL 429/162.000

ECLA H01M002/02B6B2; H01M002/02E2C; H01M002/12D2;
H01M010/04C2; H01M010/40L2

US 2005271938 IPCI H01M0002-08 [ICM,7]; H01M0010-04 [ICS,7];
H01M0004-58 [ICS,7]; H01M0010-40 [ICS,7];
H01M0002-04 [ICS,7]; H01M0002-02 [ICS,7]

NCL 429/185.000; 429/128.000; 429/162.000;
429/231.800; 429/329.000; 429/330.000;
429/176.000; 429/175.000

AB In a flat nonaq. electrolyte secondary cell comprising an
electricity-generating element including at least a **cathode**
, a separator and an anode and a nonaq. electrolyte in the inside of
a **cathode** case, a plurality of **electrode** units
each consisting of the **cathode** and the anode opposite to
each another via the separator are laminated to form an
electrode group, or an **electrode** unit in a sheet
form consisting of the **cathode** and the anode opposite to
each another via the separator is wound to form an **electrode**
group, or a sheet-shape **cathode** is wrapped with the
separator except for a part contacting at inner face of
cathode case and a sheet-shaped anode is set on the
sheet-shaped **cathode** in a right angled position each other
and then these **cathode** and anode are bent alternately to
form an **electrode** group, and the total sum of the areas of
the opposing **cathode** and anode in this **electrode**
group is larger than the area of the opening of an insulating gasket
in a sealed portion in the **cathode** case or than the area
of an opening in a sealed plate in a sealed portion in the
cathode case, whereby the discharge capacity upon
heavy-loading discharge is significantly increased as compared with
the conventional cells. Accordingly, while the size of the cell is
small, the discharge capacity is increased as described above, and
thus it is possible to provide a highly utilizable flat nonaq.
electrolyte secondary cell. Further, in the flat nonaq. electrolyte
secondary cell, problems which may be caused by the increased
discharge capacity in the cell can be solved by improving the
solvent and supporting electrolyte for the electrolyte or by various
improvements in the **cathode** and anode cases.

ST nonaq electrolyte secondary battery flat

IT Battery electrolytes

Secondary batteries

(flat nonaq. electrolyte secondary battery with improvements in

heavy loading discharge characteristics)

IT Carbonaceous materials (technological products)
 RL: DEV (Device component use); USES (Uses)
 (flat nonaq. electrolyte secondary battery with improvements in heavy loading discharge characteristics)

IT Carbon black, uses
 RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)
 (flat nonaq. electrolyte secondary battery with improvements in heavy loading discharge characteristics)

IT Fluoropolymers, uses
 Styrene-butadiene rubber, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (flat nonaq. electrolyte secondary battery with improvements in heavy loading discharge characteristics)

IT Carbon fibers, uses
 RL: DEV (Device component use); USES (Uses)
 (mesophase pitch, graphitized; flat nonaq. electrolyte secondary battery with improvements in heavy loading discharge characteristics)

IT Fluoropolymers, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (tape; flat nonaq. electrolyte secondary battery with improvements in heavy loading discharge characteristics)

IT 96-48-0, γ -Butyrolactone 96-49-1, Ethylene carbonate
 9002-88-4, Polyethylene 12190-79-3, Cobalt lithium oxide colio2
 12597-68-1, Stainless steel, uses 14283-07-9 21324-40-3, Lithium
 hexafluorophosphate 326594-36-9 326594-37-0 326594-38-1
 326594-39-2 326594-40-5 326594-41-6
 RL: DEV (Device component use); USES (Uses)
 (flat nonaq. electrolyte secondary battery with improvements in heavy loading discharge characteristics)

IT 7782-42-5, Graphite, uses
 RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)
 (flat nonaq. electrolyte secondary battery with improvements in heavy loading discharge characteristics)

IT 7440-02-0, Nickel, uses 7440-50-8, Copper, uses
 RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
 (flat nonaq. electrolyte secondary battery with improvements in heavy loading discharge characteristics)

IT 872-50-4, n-Methylpyrrolidone, uses 9000-11-7, Cmc 24937-79-9, PvdF
 RL: TEM (Technical or engineered material use); USES (Uses)
 (flat nonaq. electrolyte secondary battery with improvements in heavy loading discharge characteristics)

IT 7429-90-5, Aluminum, uses 7440-03-1, Niobium, uses 7440-32-6, Titanium, uses
 RL: MOA (Modifier or additive use); USES (Uses)
 (stainless steel contg.; flat nonaq. electrolyte secondary battery with improvements in heavy loading discharge characteristics)

IT 9003-55-8
 RL: TEM (Technical or engineered material use); USES (Uses)
 (styrene-butadiene rubber, flat nonaq. electrolyte secondary battery with improvements in heavy loading discharge characteristics)

IT 9002-84-0, PtfE
 RL: TEM (Technical or engineered material use); USES (Uses)
 (tape; flat nonaq. electrolyte secondary battery with improvements in heavy loading discharge characteristics)

L35 ANSWER 22 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN
 AN 2001:627403 HCAPLUS
 DN 135:307430
 ED Entered STN: 30 Aug 2001
 TI Mesophase coal tar pitch as an intermediate stage in production of
 electrode coke
 AU Robak, Zbigniew; Kubica, Krystyna
 CS Inst. Chem. Przerobki Wegla, Zabrze, Pol.
 SO Zeszyty Naukowe Politechniki Slaskiej, Chemia (2001), 142, 173-180
 CODEN: ZNSCAM; ISSN: 0372-9494
 PB Wydawnictwo Politechniki Slaskiej
 DT Journal
 LA Polish
 CC 57-8 (Ceramics)
 Section cross-reference(s): 51
 AB Electrode cokes is routinely produced by delayed coking of
 carefully chosen petroleum- or coal tar-derived feedstocks. The
 process has its advantages and disadvantages, and to avoid some of
 its difficulties other ways of transforming liq. **pitches**
 into hard cokes are still under investigation. We tried to obtain a
 highly anisotropic coke, with good graphitizability, by chamber
 coking of a **mesophase pitch**. This material was
 obtained from the model plant for continuous thermal treatment of
 light tar **pitches**, and typically contained .apprx.50%
mesophase. **Mesophase pitch** was
 carbonized in the semi-tech. chamber coking plant at 550°C.
 The obtained coke was investigated for its suitability for the
electrode industry. The procedure simulates the typical
 manufg. process for **graphite electrodes**, using
 as a feedstock the "**mesophase** coke" and a std. petroleum
 coke. It appeared that the "**mesophase** coke" gave
 graphitized product showing properties comparable with that obtained
 from com. Texas petroleum coke.
 ST mesophase coal tar pitch feedstock electrode coke manuf
 IT **Mesophase pitch**
 (coal tar **pitch**, precursor; processing of
mesophase coal tar **pitch** as feedstock for
 prepn. of coke for **graphite electrode** manuf.)
 IT Coke
 RL: IMF (Industrial manufacture); PEP (Physical, engineering or
 chemical process); PRP (Properties); PREP (Preparation); PROC
 (Process)
 (electrode; processing of **mesophase** coal tar
pitch as feedstock for prepn. of coke for
graphite electrode manuf.)
 IT Coal tar **pitch**
 (mesophase, precursor; processing of **mesophase**
 coal tar **pitch** as feedstock for prepn. of coke for
graphite electrode manuf.)
 IT 7782-42-5, **Graphite**, miscellaneous
 RL: MSC (Miscellaneous)
 (electrodes; processing of **mesophase** coal tar
pitch as feedstock for prepn. of coke for
graphite electrode manuf.)

L35 ANSWER 23 OF 53 INSPEC (C) 2005 IEE on STN
 AN 2003:7508108 INSPEC DN A2003-04-8630F-034; B2003-02-8410E-053
 TI Development of new anodes for rechargeable lithium batteries.
 AU Sandi, G. (Div. of Chem., Argonne Nat. Lab., IL, USA)
 SO New Materials for Electrochemical Systems IV.. Extended Abstracts of
 the Fourth International Symposium on New Materials for

Electrochemical Systems

Editor(s): Savadogo, O.

Montreal, Que., Canada: Ecole Polytechnique de Montreal, 2001. p.162
of xxiii+488 pp.

Conference: Montreal, Que., Canada, 9-13 July 2001

DT Conference Article

TC Practical

CY Canada

LA English

AB Summary form only given. Lithium ion secondary batteries are currently the best portable energy storage device for the consumer electronics market. The development of the lithium ion secondary batteries has been achieved by the use of selected carbon and **graphite** materials as an anode. The performance of lithium ion secondary batteries, such as the charge/discharge capacity, voltage profile and cyclic stability, depend strongly on the microstructure of the anode materials made of carbon and **graphite**. Due to the contribution of the carbon materials used in the anode in the last five years, the capacity of the typical Li ion battery has been improved 1.7 times. However, there are still active investigations to identify the key parameters of carbons that provide the improved anode properties, as carbon and **graphite** materials have large varieties in the microstructure, texture, crystallinity and morphology, depending on their preparation processes and precursor materials, as well as various forms such as powder, fibers and spherule. There is a strong correlation between the microstructural parameters and electrochemical properties of conventional and novel types of carbon materials for Li ion batteries, namely, graphitizable carbons such as milled **mesophase pitch**-based carbon fibers, polyparaphenylene based carbon heat-treated at low temperatures, boron doped graphitized materials, and templated carbons. a variety of tin oxide based compounds; SnO, SnO₃, LiSnO₃, and SnSiO₃ glass, have been tested as anode materials. These materials demonstrate discharge capacities on the order of 1000 mAh/(g Sn), which is consistent with the alloying capacity limit of 4.4 Li atoms per Sn atom, or 991 mAh/(g Sn). However, the irreversible capacities ranged from 200 mAh/(g active) to 700 mAh/(g active). By introducing lithium, lithium oxide and tin form first, which is then followed by the formation of the various LiSn alloy phases. Other investigations have focused on the **copper**-tin system at around the composition Cu₆Sn₅ and have determined the effect on cycling and capacity of **electrodes** with various ratios of **copper** to tin. Other systems are compared and discussed in detail. The basic scientific theory can contribute to further developments of the Li ion batteries such as polymer batteries for consumer electronics, multimedia technology and future hybrid and electric vehicles.

CC A8630F Secondary cells; A8245 Electrochemistry and electrophoresis;
B8410E Secondary cells

CT ANODES; CARBON; CARBON FIBRES; ELECTROCHEMICAL **ELECTRODES**;
GRAPHITE; LITHIUM; SECONDARY CELLS

ST anodes; rechargeable lithium batteries; lithium ion secondary
batteries; portable energy storage device; consumer electronics;
graphite materials; carbon; anode; charge/discharge
capacity; voltage profile; cyclic stability; microstructure; Li ion
battery; texture; crystallinity; morphology; preparation processes;
precursor materials; powder; fibers; spherule; microstructural
parameters; electrochemical properties; Li ion batteries;
graphitizable carbons; milled **mesophase pitch-based carbon**
fibers; polyparaphenylene based carbon; boron doped graphitized
materials; tin oxide based compounds; SnO; SnO₃; LiSnO₃; SnSiO₃

glass; irreversible capacities; **copper-tin system**; Cu₆Sn₅;
templated carbons; Li
CHI Li int, Li el
ET Li; O*Sn; SnO; Sn cp; cp; O cp; SnO₃; Li*O*Sn; Li sy 3; sy 3; O sy
3; Sn sy 3; LiSnO₃; Li cp; O*Si*Sn; Si sy 3; SnSiO₃; Si cp; Sn;
Li*Sn; Li sy 2; sy 2; Sn sy 2; LiSn; Cu*Sn; Cu sy 2; Cu₆Sn₅; Cu cp
L35 ANSWER 24 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2002:143858 HCAPLUS
DN 136:153932
ED Entered STN: 25 Feb 2002
TI Method for manufacturing cathode active material for lithium
secondary battery
IN Kim, Gwang Sik; Noh, Yeong Bae; Ryu, Jae Yul; Park, Jeong Jun; Woo,
Il Gi; Yoon, Sang Yeong
PA Samsung Sdi Co., Ltd., S. Korea
SO Repub. Korean Kongkae Taeho Kongbo, No pp. given
CODEN: KRXXA7
DT Patent
LA Korean
IC ICM H01M004-48
CC 52-2 (Electrochemical, Radiational, and Thermal Energy
Technology)

FAN.CNT 1
PATENT NO. KIND DATE APPLICATION NO. DATE

PI KR 2000037532 A 20000705 KR 1998-52140 199812
01

PRAI KR 1998-52140 19981201

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
KR 2000037532	ICM	H01M004-48
	IPCI	H01M0004-48 [ICM,7]

AB A cathode active material for a lithium secondary battery
is provided to enhance the charging and discharging characteristics
and cycle life by manufg. the cathode active material by
mixing a natural **black lead** with a synthetic
black lead. A cathode active material
for a lithium secondary battery is manufd. by mixing a natural
black lead with a synthetic **black lead**
lead. By mixing the natural **black lead**
with the synthetic **black lead**, the difference of
the elec. cond. between a-axis and c-axis is reduced by providing a
conductive passage. The synthetic **black lead** is
a milled carbon fiber made of a **mesophase pitch**.
ST cathode active material lithium secondary battery
IT Secondary batteries
(lithium; method for manufg. cathode active material for lithium
secondary battery)
IT Battery cathodes
Mesophase pitch
(method for manufg. cathode active material for lithium secondary
battery)
IT Carbon fibers, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(method for manufg. cathode active material for lithium secondary
battery)
IT 7439-92-1, Lead, uses
RL: DEV (Device component use); USES (Uses)

(black, natural and synthetic; method for manufg. cathode active material for lithium secondary battery)

L35 ANSWER 25 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN

AN 2000:53110 HCAPLUS

DN 132:110583

ED Entered STN: 23 Jan 2000

TI Secondary lithium batteries using cathodes containing mixed oxides

IN Ikasaki, Yoshiyuki; Sakurai, Katsuyuki; Hasebe, Hiroyuki

PA Toshiba Corp., Japan

SO Jpn. Kokai Tokkyo Koho, 18 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01M004-62

ICS H01M004-02; H01M004-58; H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2000021407	A2	20000121	JP 1998-184443	19980630

JP 2971451 B2 19991108
PRAI JP 1998-184443 19980630

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2000021407	ICM	H01M004-62
	ICS	H01M004-02; H01M004-58; H01M010-40
	IPCI	H01M0004-62 [ICM,6]; H01M0004-02 [ICS,6]; H01M0004-58 [ICS,6]; H01M0010-40 [ICS,6]
AB		The batteries have cathodes contg. $\text{LiNi}_{1-x}\text{M}_x\text{O}_2$ ($\text{M} = \text{element}; 0 < x \leq 0.5$), elec. conductors contg. carbonaceous materials (A) and (B) having av. sizes $\leq 100 \text{ nm}$ and $\geq 1 \mu\text{m}$, resp., and binders contg. acrylic rubber copolymers and $\leq 45 \text{ wt.}\%$ (based on binders) vinylidene fluoride-type fluoropolymers, anodes, and nonaq. electrolyte solns. The batteries have long cycle life.
ST		battery cathode lithium oxide acrylic binder; carbon fluoropolymer lithium oxide battery cathode
IT		Synthetic rubber, uses RL: DEV (Device component use); USES (Uses) (acrylic acid-butadiene-itaconic acid-Me methacrylate-styrene; secondary Li batteries using cathodes contg. mixed oxides, C, and polymer binders for long cycle life)
IT		Synthetic rubber, uses RL: DEV (Device component use); USES (Uses) (acrylonitrile-butadiene-fumaric acid-itaconic acid-Me methacrylate-styrene; secondary Li batteries using cathodes contg. mixed oxides, C, and polymer binders for long cycle life)
IT		Synthetic rubber, uses RL: DEV (Device component use); USES (Uses) (acrylonitrile-butadiene-itaconic acid-Me methacrylate-styrene; secondary Li batteries using cathodes contg. mixed oxides, C, and polymer binders for long cycle life)
IT		Carbon fibers, uses RL: DEV (Device component use); USES (Uses) (graphite, mesophase pitch-based, anodes; secondary Li batteries using cathodes contg. mixed oxides, C, and polymer binders for long cycle life)

IT Secondary batteries
 (lithium; secondary Li batteries using cathodes contg. mixed
 oxides, C, and polymer binders for long cycle life)

IT Battery anodes
 Battery cathodes
 Battery electrolytes
 (secondary Li batteries using cathodes contg. mixed oxides, C,
 and polymer binders for long cycle life)

IT Carbon black, uses
 Carbonaceous materials (technological products)
 Fluoropolymers, uses
 Oxides (inorganic), uses
 RL: DEV (Device component use); USES (Uses)
 (secondary Li batteries using cathodes contg. mixed oxides, C,
 and polymer binders for long cycle life)

IT 75-05-8, Acetonitrile, uses 96-48-0, γ -Butyrolactone
 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate
 108-32-7, Propylene carbonate 616-38-6, Dimethyl carbonate
 623-53-0, Methyl ethyl carbonate 73506-93-1, Diethoxyethane
 RL: DEV (Device component use); USES (Uses)
 (electrolyte soln.; secondary Li batteries using cathodes contg.
 mixed oxides, C, and polymer binders for long cycle life)

IT 21324-40-3, Lithium hexafluorophosphate
 RL: DEV (Device component use); USES (Uses)
 (electrolyte; secondary Li batteries using cathodes contg. mixed
 oxides, C, and polymer binders for long cycle life)

IT 70857-13-5, Acrylonitrile-butadiene-itaconic acid-methyl
 methacrylate-styrene copolymer 70857-14-6, Acrylic
 acid-butadiene-itaconic acid-methyl methacrylate-styrene copolymer
 118295-24-2, Acrylonitrile-butadiene-fumaric acid-itaconic
 acid-methyl methacrylate-styrene copolymer
 RL: DEV (Device component use); USES (Uses)
 (rubber; secondary Li batteries using cathodes contg. mixed
 oxides, C, and polymer binders for long cycle life)

IT 75-38-7D, Vinylidene fluoride, carboxy derivs., polymers
 7782-42-5, Graphite, uses 24937-79-9, Poly(vinylidene fluoride)
 RL: DEV (Device component use); USES (Uses)
 (secondary Li batteries using cathodes contg. mixed oxides, C,
 and polymer binders for long cycle life)

IT 113066-89-0P, Cobalt lithium nickel oxide (Co_{0.2}LiNi_{0.8}O₂)
 255063-53-7P, Aluminum cobalt lithium nickel oxide
 (Al_{0.03}Co_{0.17}LiNi_{0.8}O₂) 255063-55-9P, Cobalt lithium nickel borate
 oxide (Co_{0.17}LiNi_{0.8}(BO₃)_{0.03}O_{1.91})
 RL: DEV (Device component use); PNU (Preparation, unclassified);
 PREP (Preparation); USES (Uses)
 (secondary Li batteries using cathodes contg. mixed oxides, C,
 and polymer binders for long cycle life)

L35 ANSWER 26 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN
 AN 2000:723263 HCAPLUS
 DN 133:269460
 ED Entered STN: 13 Oct 2000
 TI Lithium secondary battery
 IN Sato, Asako; Kuboki, Takashi; Yamada, Shuji; Hasebe, Hiroyuki;
 Takami, Norio; Ohsaki, Takahisa; Kanda, Motoya
 PA Kabushiki Kaisha Toshiba, Japan
 SO Eur. Pat. Appl., 52 pp.
 CODEN: EPXXDW
 DT Patent
 LA English
 IC ICM H01M002-02
 ICS H01M010-04

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1043782	A2	20001011	EP 2000-106079	20000330
EP 1043782	A3	20011114		
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
US 6589690	B1	20030708	US 2000-536685	20000328
CN 1273439	A	20001115	CN 2000-118175	20000330
CN 1133228	B	20031231		
JP 2000348776	A2	20001215	JP 2000-94680	20000330
JP 3721044	B2	20051130		
TW 451511	B	20010821	TW 2000-89105965	20000330
JP 2004047479	A2	20040212	JP 2003-285821	20030804
PRAI JP 1999-89173	A	19990330		
JP 1999-89175	A	19990330		
JP 2000-94680	A3	20000330		

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
EP 1043782	ICM	H01M002-02
	ICS	H01M010-04
	IPCI	H01M0002-02 [ICM,6]; H01M0010-04 [ICS,6]
	ECLA	H01M002/02E2D; H01M010/04; H01M010/04F
US 6589690	IPCI	H01H0069-02 [ICM,7]; H01M0006-00 [ICS,7]; H01M0004-58 [ICS,7]
	NCL	429/162.000; 029/623.100; 029/623.300; 029/623.500; 429/160.000; 429/164.000; 429/231.800; 429/231.950
CN 1273439	ECLA	H01M002/02E2D; H01M010/04; H01M010/04F
JP 2000348776	IPCI	H01M0010-40 [ICM,7]; H01M0010-36 [ICS,7]
	IPCI	H01M0010-40 [ICM,7]; H01M0010-40 [ICS,7]; H01M0002-02 [ICS,7]; H01M0002-18 [ICS,7]; H01M0010-04 [ICS,7]; H01M0004-58 [ICS,7]
TW 451511	IPCI	H01M0010-40 [ICM,7]
JP 2004047479	IPCI	H01M0010-40 [ICM,7]; H01M0002-02 [ICS,7]; H01M0004-02 [ICS,7]; H01M0004-58 [ICS,7]
	FTERM	5H011/AA03; 5H011/AA13; 5H011/CC02; 5H011/CC06; 5H011/CC10; 5H011/DD01; 5H011/DD03; 5H011/DD13; 5H011/KK01; 5H029/AJ05; 5H029/AJ12; 5H029/AK02; 5H029/AK03; 5H029/AK05; 5H029/AL01; 5H029/AL02; 5H029/AL03; 5H029/AL04; 5H029/AL06; 5H029/AL07; 5H029/AL08; 5H029/AL12; 5H029/AM02; 5H029/AM03; 5H029/AM04; 5H029/AM05; 5H029/AM07; 5H029/AM16; 5H029/BJ04; 5H029/BJ14; 5H029/DJ02; 5H029/DJ04; 5H029/EJ04; 5H029/EJ12; 5H029/HJ04; 5H050/AA07; 5H050/AA15; 5H050/BA17; 5H050/CA02; 5H050/CA05; 5H050/CA07; 5H050/CA08; 5H050/CA09; 5H050/CA11;

5H050/CB01; 5H050/CB02; 5H050/CB03; 5H050/CB05;
 5H050/CB07; 5H050/CB08; 5H050/CB09; 5H050/CB12;
 5H050/DA04; 5H050/DA19; 5H050/EA09; 5H050/EA24;
 5H050/FA05; 5H050/HA04

- AB A secondary battery comprises an **electrode** group with a pos. **electrode**, a neg. **electrode** having a neg. **electrode** collector and a neg. **electrode** layer held to the collector, and a separator interposed between the pos. **electrode** and the neg. **electrode** layer, a nonaq. electrolyte held by the **electrode** group, and a jacket housing the **electrode** group and having a thickness of not more than 0.3 mm. The pos. **electrode**, the neg. **electrode** and the separator are formed integral, and the peeling strength between the neg. **electrode** layer and the separator is lower than the peeling strength between the neg. **electrode** layer and the neg. **electrode** collector.
- ST lithium secondary battery
- IT Fluoropolymers, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (binder; lithium secondary battery)
- IT Battery anodes
 Battery **cathodes**
 (lithium secondary battery)
- IT Carbon fibers, uses
 RL: DEV (Device component use); USES (Uses)
 (lithium secondary battery)
- IT Carbon black, uses
 RL: MOA (Modifier or additive use); USES (Uses)
 (lithium secondary battery)
- IT Secondary batteries
 (lithium; lithium secondary battery)
- IT Carbon fibers, uses
 RL: DEV (Device component use); USES (Uses)
 (**mesophase** pitch-based; lithium secondary battery)
- IT Carbon fibers, uses
 RL: DEV (Device component use); USES (Uses)
 (**pitch**-based; lithium secondary battery)
- IT Polyimides, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (resin; lithium secondary battery)
- IT 25014-41-9, Polyacrylonitrile
 RL: TEM (Technical or engineered material use); USES (Uses)
 (adhesive; lithium secondary battery)
- IT 24937-79-9, PvdF
 RL: TEM (Technical or engineered material use); USES (Uses)
 (binder; lithium secondary battery)
- IT 96-48-0, γ -Butyrolactone 96-49-1, Ethylene carbonate
 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate
 7429-90-5, Aluminum, uses 7440-50-8, **Copper**,
 uses 9002-88-4, Polyethylene 14283-07-9, Lithium
 tetrafluoroborate 21324-40-3, Lithium hexafluorophosphate
 111706-40-2, Cobalt lithium oxide CoLiO-102 113066-89-0, Cobalt
 lithium nickel oxide Co_{0.2}LiNi_{0.8}O₂
 RL: DEV (Device component use); USES (Uses)
 (lithium secondary battery)
- IT 7782-42-5, **Graphite**, uses
 RL: MOA (Modifier or additive use); USES (Uses)
 (lithium secondary battery)
- IT 9003-07-0, Polypropylene
 RL: TEM (Technical or engineered material use); USES (Uses)
 (lithium secondary battery)

IT 7440-44-0, Carbon, uses
 RL: DEV (Device component use); USES (Uses)
 (spheres or granules; lithium secondary battery)

L35 ANSWER 27 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN
 AN 1999:465067 HCAPLUS
 DN 131:288727
 ED Entered STN: 29 Jul 1999
 TI Characteristics of coke carbon modified with mesophase-pitch as a
 negative electrode for lithium ion batteries
 AU Sato, Yuichi; Kikuchi, Yasuo; Nakano, Takeshi; Okuno, Gaku;
 Kobayakawa, Koichi; Kawai, Takanobu; Yokoyama, Akira
 CS Faculty of Engineering, Department of Applied Chemistry, Kanagawa
 University, Kanagawa-ku, Yokohama, Japan
 SO Journal of Power Sources (1999), 81-82, 182-186
 CODEN: JPSODZ; ISSN: 0378-7753
 PB Elsevier Science S.A.
 DT Journal
 LA English
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy
 Technology)
 Section cross-reference(s): 57, 72

AB To increase the charge-discharge capacity of carbon electrodes for
 lithium ion secondary batteries, coke carbon, a relatively cheap
 material, was modified with mesophase-pitch carbon by a heat
 treatment. While coke carbon powder, mesophase-pitch, and a mixt.
 thereof (4:1 by wt.) supplied between 0 and 1.5 V vs. Li/Li+ an
 initial discharge capacity of about 295 mA-h/g, 310 mA-h/g, and 310
 mA-h/g, resp., the modified coke deintercalated 400 mA-h/g of
 lithium with a high degree of reversibility. The difference in
 capacity between the modified carbon and mixt. are discussed based
 on the shape of their current-potential curves and their
 galvanostatic charge-discharge curves.

ST lithium battery anode coke carbon
 IT Battery anodes
 Cyclic voltammetry
 (characteristics of coke carbon modified with mesophase-pitch as
 a neg. electrode for lithium ion batteries)

IT Carbonaceous materials (technological products)
 Coke
 RL: DEV (Device component use); USES (Uses)
 (characteristics of coke carbon modified with mesophase-pitch as
 a neg. electrode for lithium ion batteries)

IT Secondary batteries
 (lithium; characteristics of coke carbon modified with
 mesophase-pitch as a neg. electrode for lithium ion batteries)

IT 7440-44-0, Carbon, uses 7782-42-5, Graphite,
 uses
 RL: DEV (Device component use); USES (Uses)
 (characteristics of coke carbon modified with mesophase
 -pitch as a neg. electrode for lithium ion
 batteries)

RE.CNT 21 THERE ARE 21 CITED REFERENCES AVAILABLE FOR THIS RECORD
 RE
 (1) Alamgir, M; J Electrochem Soc 1993, V141, PL143
 (2) Bar-Tow, D; The Electrochemical Soc Meeting Abstracts 1996, V96-2,
 P1028
 (3) Besenhard, J; J Power Sources 1995, V54, P228 HCAPLUS
 (4) Disma, E; J Electrochem Soc 1996, V143, P3959
 (5) Eli, Y; J Electrochem Soc 1997, V144, P2968
 (6) Fong, R; J Electrochem Soc 1990, V137, P2009 HCAPLUS
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- (9) JSPS; Tanso 1963, V36, P25
- (10) Kikuchi, M; J Electroanal Chem 1995, V396, P451 HCAPLUS
- (11) Kinoshita, K; Carbon Electrochemical and Physicochemical Properties 1988
- (12) Mabuchi, A; J Electrochem Soc 1995, V142, P1041 HCAPLUS
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- (14) Ohsaki, T; Proceeding of the 34th Battery Symposium in Japan 1993, P79
- (15) Omaru, A; The Electrochemical Soc Extended Abstracts 1992, V92-2, P34
- (16) Sato, K; Science 1994, V264, P556 HCAPLUS
- (17) Sonbe, N; Proceedings of the 35th Battery Symposium in Japan 1994, P47
- (18) Takami, N; J Electrochem Soc 1995, V142, P371 HCAPLUS
- (19) Tatsumi, K; J Electrochem Soc 1995, V142, P716 HCAPLUS
- (20) Tuinstra, F; J Chem Phys 1970, V53, P1126 HCAPLUS
- (21) Yata, S; Synth Met 1994, V62, P153 HCAPLUS

L35 ANSWER 28 OF 53 JAPIO (C) 2005 JPO on STN
 AN 1998-121054 JAPIO
 TI PRODUCTION OF NONSCALELIKE CARBONACEOUS POWDER AND GRAPHITE POWDER
 IN SAKAI YUKIO; FUJIURA TAKATSUGU
 PA MITSUBISHI GAS CHEM CO INC
 PI JP 10121054 A 19980512 Heisei
 AI JP 1996-278012 (JP08278012 Heisei) 19961021
 PRAI JP 1996-278012 19961021
 SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1998

IC ICM C10C003-02
 ICS C01B031-02; C01B031-04; C10C003-04; C10C003-10; H01M004-02; H01M004-04; H01M004-58

AB PROBLEM TO BE SOLVED: To obtain nearly **spherical** nonscalelike carbonaceous powder by heat-treating specified **synthetic mesophase** pitch in a specified temperature range in nonoxidizing atmosphere and grinding the treated pitch.
 SOLUTION: This powder is obtained by heat-treating **mesophase** pitch obtained by polymerizing fused polycyclic hydrocarbon or a material containing it in a temperature region of 470-700°C in the presence of hydrogen fluoride or boron trifluoride in nonoxidizing atmosphere and grinding the treated pitch. The nonoxidizing gas used is exemplified by nitrogen or argon. The powder is graphitized at 1,900-3,000°C without undergoing fusion among particles to obtain nonscalelike higher crystalline **graphite** powder retaining the shape after the grinding. The **graphite** powder is desirable as a negative **electrode** material of a lithium ion battery and is very advantageous to improve **electrode** packing properties and to thereby attain a high energy density. Further, it has excellent conductivity and therefore it is usable also as a conductive filler for various materials.
 COPYRIGHT: (C)1998,JPO

L35 ANSWER 29 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN
 AN 1997:388601 HCAPLUS
 DN 127:20944
 ED Entered STN: 21 Jun 1997
 TI Method for manufacture of carbonaceous material for nonaqueous lithium secondary batteries
 IN Nishimura, Kasuke
 PA Petoca, Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 9 pp.
CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01M004-58

ICS D01F009-145; H01M004-02; H01M004-04; D21H013-50
CC 52-2 (Electrochemical, Radiational, and Thermal Energy
Technology)

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 09092283	A2	19970404	JP 1995-263710	19950919

PRAI JP 1995-263710

19950919

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 09092283	ICM	H01M004-58
	ICS	D01F009-145; H01M004-02; H01M004-04; D21H013-50
	IPCI	H01M0004-58 [ICM,6]; D01F0009-145 [ICS,6]; H01M0004-02 [ICS,6]; H01M0004-04 [ICS,6]; D21H0013-50 [ICS,6]
AB		The carbonaceous material is paper sheets 50-200 μ m thick having an apparent d. 1.0-1.5 g/cm ³ , prepd. from 5-30% C fibers 1-20 μ m in length and 5-10% mesophase pitch-based micro C beads and/or powd. graphite (natural or synthetic), and is used for cathodes of nonaq. Li secondary batteries.
ST		carbon fiber micro bead battery cathode
IT		Battery cathodes (carbon fibers and mesophase pitch-based beads for nonaq. lithium secondary batteries)
IT		Carbon fibers, uses RL: TEM (Technical or engineered material use); USES (Uses) (carbon fibers and mesophase pitch-based beads for nonaq. lithium secondary batteries)
IT		Secondary batteries (lithium; carbon fibers and mesophase pitch-based beads for nonaq. lithium secondary batteries)

L35 ANSWER 30 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN

AN 1997:723810 HCAPLUS

DN 128:24881

ED Entered STN: 17 Nov 1997

TI High-capacity lithium-ion cells using graphitized mesophase-pitch-based carbon fiber anodes

AU Ohsaki, Takahisa; Kanda, Motoya; Aoki, Yoshiyasu; Shiroki, Hiroyuki; Suzuki, Shintaro

CS Saiwai-ku, 72 Horikawa-cho, Toshiba Corporation, Materials and Devices Research Laboratories, R+D Center, Kawasaki 210, Japan

SO Journal of Power Sources (1997), 68(1), 102-105
CODEN: JPSODZ; ISSN: 0378-7753

PB Elsevier

DT Journal

LA English

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

AB The authors developed high-capacity lithium-ion cells using graphitized mesophase-pitch-based carbon fiber (MCF) as an anode material. The graphitized MCF is a highly graphitized carbon fiber with a radial-like texture in the cross

section. This structure contributes to the rapid diffusion of lithium ions inside the carbon fiber. The diffusion coeff. of lithium ions in the graphitized MCF was one order of magnitude larger than that for **graphite**, resulting in an excellent high-rate performance of the carbon **electrode**. The graphitized MCF anode showed larger capacity, higher rate capability, and better reversibility than the **graphite** anode. Prismatic cell (8.6 mm + 34 mm + 48 mm) with the graphitized MCF anode exhibited a large capacity of >1000 mA-h. At 3 A discharge, the prismatic cell had 95% of its capacity at 0.5 A discharge with a mid-discharge voltage of 3.35 V. The cell maintained >85% of its initial capacity after 500 cycles and showed high capacity at -20°. It has thus been demonstrated that the prismatic cell using the graphitized MCF anode has excellent performance, and is an attractive choice for the power sources of cellular phones and other appliances.

ST lithium ion battery development; carbon fiber graphitized anode
lithium battery

IT Battery anodes
Secondary batteries
(development and performance of high-capacity lithium-ion
batteries with graphitized mesophase-pitch-based carbon fiber
anodes)

IT Carbon fibers, uses
Carbon fibers, uses
RL: DEV (Device component use); USES (Uses)
(graphite, pitch-based; development and performance of
high-capacity lithium-ion batteries with graphitized
mesophase-pitch-based carbon fiber anodes)

RE.CNT 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD

- RE
(1) Fong, R; J Electrochem Soc 1990, V137, P2009 HCAPLUS
(2) Imanishi, N; J Electrochem Soc 1993, V140, P315 HCAPLUS
(3) Inada, K; Proc Primary and Secondary Ambient Temperature Lithium
Batteries 1988, V88-6, P530 HCAPLUS
(4) Mohri, M; J Power Sources 1989, V26, P545 HCAPLUS
(5) Sato, M; Primary and Secondary Lithium Batteries 1991, V91-3, P407
HCAPLUS
(6) Takami, N; J Electrochem Soc 1995, V142, P2564 HCAPLUS
(7) Takami, N; J Electrochem Soc 1995, V142, P371 HCAPLUS
(8) Yazami, R; J Power Sources 1983, V9, P365 HCAPLUS

L35 ANSWER 31 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN DUPLICATE 3

AN 1995:503423 HCAPLUS

DN 122:244195

ED Entered STN: 22 Apr 1995

TI Nonaqueous electrolyte secondary lithium batteries

IN Sugimoto, Toyoji; Ozaki, Yoshuki; Ootsuka, Atsushi; Takai, Tooru

PA Matsushita Electric Ind Co Ltd, Japan

SO Jpn. Kokai Tokkyo Koho, 5 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01M010-40

ICS H01M004-02

CC 52-2 (Electrochemical, Radiational, and Thermal Energy
Technology)

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI JP 07037618	A2	19950207	JP 1993-181141	

199307
22

PRAI JP 1993-181141

19930722

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES		
JP 07037618	ICM	H01M010-40		
	ICS	H01M004-02		
	IPCI	H01M0010-40 [ICM,6]; H01M0004-02 [ICS,6]		
AB		The batteries comprise Li-contg. mixed oxide cathodes , nonaq. electrolytes, rechargeable cathodes of composite carbon materials consisting of spherical graphite particles having optically anisotropic single phase, and other graphite fine particles having an av. diam. smaller than that of another graphite particles. The spherical graphite particles may be manufd. by graphitization of mesocarbon microbeads from mesophase small spheres formed at carbonization of pitch , have lamella structures, and lattice distance (d002) 3.36-3.39 Å. The composite carbon materials may contain ≤20%, preferably 3-15%, the graphite fine particles to the spherical graphite particles. The graphite fine particles may be natural or synthetic graphite from petroleum or coal pitch .		
ST		graphite lithium battery anode		
IT		Anodes (battery, anodes contg. different graphite particles for secondary Li batteries for cycle performance)		
IT		Pitch (coal-tar, graphite from; anodes contg. different graphite particles for secondary Li batteries for cycle performance)		
IT		Pitch (petroleum, graphite from; anodes contg. different graphite particles for secondary Li batteries for cycle performance)		
IT		7782-42-5, Graphite, uses RL: DEV (Device component use); USES (Uses) (anodes contg. different graphite particles for secondary Li batteries for cycle performance)		
IT		7440-44-0, Mesocarbon microbeads, uses RL: DEV (Device component use); USES (Uses) (graphitized; anodes contg. different graphite particles for secondary Li batteries for cycle performance)		
L35		ANSWER 32 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN		
AN		1995:709126 HCAPLUS		
DN		123:88518		
ED		Entered STN: 29 Jul 1995		
TI		Secondary nonaqueous electrolyte batteries having improved anodes		
IN		Ootsuka, Atsushi; Sugimoto, Toyoji; Ozaki, Yoshuki; Takai, Tooru		
PA		Matsushita Electric Ind Co Ltd, Japan		
SO		Jpn. Kokai Tokkyo Koho, 7 pp. CODEN: JKXXAF		
DT		Patent		
LA		Japanese		
IC		ICM H01M004-02 ICS H01M004-58; H01M010-40		
CC		52-2 (Electrochemical, Radiational, and Thermal Energy Technology)		
FAN.CNT 1				
	PATENT NO.	KIND DATE APPLICATION NO. DATE		
	-----	-----	-----	-----

PI JP 07134988 A2 19950523 JP 1993-281159 199311
10

JP 3048808 B2 20000605
PRAI JP 1993-281159 19931110

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 07134988	ICM	H01M004-02
	ICS	H01M004-58; H01M010-40
	IPCI	H01M0004-02 [ICM,6]; H01M0004-58 [ICS,6]; H01M0010-40 [ICS,6]

AB In the batteries having Li-contg. oxides as **cathode** active mass, powd. **graphite**-based rechargeable anodes, and nonaq. electrolytes, the **graphite** powders as Li-intercalatable and optically anisotropic spheres are obtained by graphitizing **mesophase** small spheres formed in low-temp. heating of **pitch**es and have monophase lamellar structure, 002 plane lattice spacing (d002) by wide-angle x-ray diffraction 3.36-3.40 Å, and sp. surface area by BET method 0.7-5.0 m²/g. The batteries have high capacity, energy d., and storage property.

ST battery anode graphite powder

IT Anodes
(battery, nonaq. electrolyte batteries using anodes of Li-intercalatable graphite powders having limited structure and surface)

IT 7439-93-2, Lithium, uses
RL: DEV (Device component use); USES (Uses)
(nonaq. electrolyte batteries using anodes of Li-intercalatable graphite powders having limited structure and surface)

IT 7782-42-5, Graphite, uses
RL: DEV (Device component use); USES (Uses)
(powd.; nonaq. electrolyte batteries using anodes of Li-intercalatable graphite powders having limited structure and surface)

L35 ANSWER 33 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 1995:899204 HCAPLUS
DN 123:291865
ED Entered STN: 07 Nov 1995
TI Cathode for secondary lithium batteries and its manufacture
IN Takami, Norio; Ohsaki, Takahisa; Tamaki, Toshio; Nakajima, Hideyuki; Katsuta, Yasushi
PA Kabushiki Kaisha Toshiba, Japan; Petroca, Ltd.
SO Eur. Pat. Appl., 17 pp.
CODEN: EPXXDW
DT Patent
LA English
IC ICM H01M004-58
CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 675555	A1	19951004	EP 1995-104869	199503 31
EP 675555 R: DE, FR, GB	B1	19990728		
CN 1113351	A	19951213	CN 1995-103839	199503

31

CN 1048357 B 20000112
JP 08069798 A2 19960312 JP 1995-97691

199503
31

JP 3617550 B2 20050209
US 5795678 A 19980818 US 1995-414195

199503
31

PRAI JP 1994-85246 A 19940401

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
EP 675555	ICM	H01M004-58
	IPCI	H01M0004-58 [ICM,6]
	ECLA	H01M004/58E2
CN 1113351	IPCI	H01M0004-62 [ICM,5]; H01M0004-64 [ICS,5]; H01M0004-38 [ICS,5]; H01M0004-04 [ICS,5]
JP 08069798	IPCI	H01M0004-58 [ICM,6]; D01F0009-145 [ICS,6]; H01M0004-02 [ICS,6]; H01M0004-04 [ICS,6]; H01M0010-40 [ICS,6]
US 5795678	IPCI	H01M0004-58 [ICM,6]; H01M0004-02 [ICS,6]
	NCL	429/218.100; 429/209.000
	ECLA	H01M004/58E2

AB The **cathode** comprises milled **graphite** fibers derived from **mesophase pitch** each having circumferential, upper end and lower end faces. Each milled **graphite** fiber is composed of **graphite** layers having voids between them as inlets and outlets for Li ions, and the circumferential, upper end and lower end faces having openings of the voids between the **graphite** layers. This **cathode** can be used to provide a secondary nonaq.-electrolyte battery of large charge and discharge capacities and high charge or discharge c.d.

ST **graphite** fiber milled battery **cathode**;
pitch mesophase milled **graphite** fiber **cathode**

IT **Cathodes**
(battery, milled **graphite** fibers from **mesophase pitch** for)

IT Carbon fibers, uses
RL: DEV (Device component use); PNU (Preparation, unclassified); PRP (Properties); PREP (Preparation); USES (Uses)
(**graphite**, **cathodes** for secondary lithium batteries)

IT **Pitch**
(**mesophase**, battery **cathodes** from milled **graphite** fibers from)

L35 ANSWER 34 OF 53 JAPIO (C) 2005 JPO on STN

AN 1995-226204 JAPIO

TI MANUFACTURE OF NONAQUEOUS ELECTROLYTE SECONDARY BATTERY

IN OZAKI YOSHIYUKI; KOSHINA HIDE

PA MATSUSHITA ELECTRIC IND CO LTD

PI JP 07226204 A 19950822 Heisei

AI JP 1994-16338 (JP06016338 Heisei) 19940210

PRAI JP 1994-16338 19940210

SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1995

IC ICM H01M004-58
ICS H01M004-02; H01M004-04; H01M004-96; H01M010-40

AB PURPOSE: To provide a nonaqueous electrolyte secondary battery with high capacity recovery capability and high charge/discharge cycle

performance by preventing the deposition of metallic lithium on the surface of an **electrode** by use of a negative **electrode** made mainly of **mesophase graphite**.

CONSTITUTION: **Mesophase** spherules are produced by heat melting treatment of coal **pitch**. The **mesophase** spherules are crushed, carbonized, and graphitized to produce **mesophase graphite**. Paste mainly comprising the **mesophase graphite** is applied to both surfaces of a foil core material of **copper** and the like and they are press molded to form a negative **electrode**. The negative **electrode** and a positive **electrode** are spirally wound through a separator to form an **electrode** group 4. From the **electrode** group 4, a positive lead 5 is connected to a sealing plate 2, and a negative lead 6 to the bottom of a battery case 1, The upper and lower parts of the **electrode** group 4 are covered with an insulating ring 7 respectively. They are housed in the battery case 1, and the battery case 1 is sealed with the sealing plate 2 through an insulating gasket 3. A secondary battery having high capacity, high energy density, and high charging performance at low temperature is provided.
COPYRIGHT: (C)1995,JPO

L35 ANSWER 35 OF 53 JAPIO (C) 2005 JPO on STN
AN 1995-153486 JAPIO
TI LITHIUM SECONDARY BATTERY
IN TSUKAMOTO HISASHI
PA JAPAN STORAGE BATTERY CO LTD
PI JP 07153486 A 19950616 Heisei
AI JP 1993-326273 (JP05326273 Heisei) 19931130
PRAI JP 1993-326273 19931130
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1995
IC ICM H01M010-36
ICS H01M010-40
AB PURPOSE: To improve the high-rate discharge characteristic at a low temperature by using a lithium secondary battery added with gamma butyrolactone of a specific range % (volume &) to a mixture of ethylene carbonate and dimethyl carbonate at the specific volume ratio.
CONSTITUTION: The dielectric constant of an electrolyte added and mixed with gamma butyrolactone to a mixture of ethylene carbonate (EC) and dimethyl carbonate (DMC) at the volume ratio of 1:1 at -20°C is higher than that of the conventional mixture of EC+DMC+DEC (2:2:1). LiCoO_2 having the average grain size of $6\mu\text{m}$, acetylene black powder, and polyvinylidene fluoride are mixed, N-methyl pyrrolidone is added into a paste shape, and it is coated with an Al foil to form a positive **electrode** plate, for example. **Artificial graphite** and **spherical graphite** are mixed, polyvinylidene is mixed, N-methyl pyrrolidone is added, and it is applied to a copper foil to form a negative **electrode** plate. Both **electrode** plates are stored in a container, and the electrolyte is injected to obtain a battery having a high-rate discharge characteristic at a low temperature.
COPYRIGHT: (C)1995,JPO

L35 ANSWER 36 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 1995:539256 HCAPLUS
DN 122:295263
ED Entered STN: 10 May 1995
TI Battery characteristics with various carbonaceous materials

AU Kuribayashi, Isao; Yokoyama, Mika; Yamashita, Masataka
 CS A and T Battery Corporation, Imperial Tower 17F, 1-1 Uchisaiwai-cho,
 1-chome, Chiyoda-ku, Tokyo, 100, Japan
 SO Journal of Power Sources (1995), 54(1), 1-5
 CODEN: JPSODZ; ISSN: 0378-7753
 PB Elsevier
 DT Journal
 LA English
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy
 Technology)
 AB Various carbonaceous particles having a core-shell structure,
 produced from **graphite** and pseudo-**graphite**
 coated with pitch-blended phenol resin and green
mesophase-pitch coated with phenol resin and
 ground **graphite** powder, were investigated as active
 materials for neg. **electrodes**. The particles with natural
graphite cores, as well as those with pseudo-
graphite cores, were stable both in 1M LiClO₄-PC (propylene
 carbonate):EC (ethylene carbonate) (50:50) electrolyte and in 1.5M
 LiBF₄-PC:EC:BL (γ -butyrolactone) (25:25:50) electrolyte, and
 showed excellent elec. capacities. Those produced from green
mesophase-pitch cores were of markedly deformed
 configuration and showed large capacity gains with only small addns.
 of **graphite** powder to the phenol coating material. Neg.
electrodes, in which the particles contg. natural
graphites cores were blended with petroleum coke in various
 ratios, showed that it may be possible to produce cells with
 specific discharge voltage curves, by varying the ratio of this
 blend.
 ST carbonaceous material anode battery
 IT Carbonaceous materials
 RL: DEV (Device component use); USES (Uses)
 (battery characteristics with various carbonaceous materials)
 IT Phenolic resins, uses
 RL: DEV (Device component use); USES (Uses)
 (carbonaceous particles coated with pitch-blended; battery
 characteristics with various carbonaceous materials)
 IT Anodes
 (battery, battery characteristics with various carbonaceous
 materials)
 IT Coke
 RL: DEV (Device component use); USES (Uses)
 (petroleum, battery characteristics with various carbonaceous
 materials)
 IT 7782-42-5, Graphite, uses
 RL: DEV (Device component use); USES (Uses)
 (natural and artificial; battery characteristics with various
 carbonaceous materials)
 L35 ANSWER 37 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN
 AN 1995:232637 HCAPLUS
 DN 122:35101
 ED Entered STN: 08 Dec 1994
 TI Carbon fibers and natural graphite as negative electrodes for
 lithium ion-type batteries
 AU Yazami, R.; Zaghib, K.; Deschamps, M.
 CS Laboratoire d'Ionique et d'Electrochimie du Solide de Grenoble (URA
 CNRS 1213), ENSEEG, BP 75, Saint-Martin-d'Heres, 38402, Fr.
 SO Journal of Power Sources (1994), 52(1), 55-60
 CODEN: JPSODZ; ISSN: 0378-7753
 PB Elsevier
 DT Journal

LA English
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 72
 AB Carbon fibers (CFs), from different origins, and natural graphite are used as host lattices for lithium electrochem. intercalation and de-intercalation in org. liq. and solid polymer electrolytes, resp. In both systems, irreversible behavior occurred during the first cycle of which the origin is tentatively discussed. The reversible capacity of the mesophase CFs-based electrodes, which is related to the total relative amt. of lithium exchanged with the electrolyte during the charge/discharge operations, is found to increase with their crystallinity. Some thermodyn. data assocd. with the formation of the stage-1 graphite-lithium compd. in polymer electrolyte-based cells are detd.
 ST lithium battery anode carbon fiber graphite
 IT Carbon fibers, uses
 RL: DEV (Device component use); USES (Uses)
 (carbon fibers and natural graphite as neg. electrodes for lithium ion-type batteries)
 IT Pitch
 (isotropic, precursor for carbon fibers; carbon fibers and natural graphite as neg. electrodes for lithium ion-type batteries)
 IT Batteries, secondary
 (lithium/PEO-lithium perchlorate/graphite lithium and lithium/propylene carbonate-ethylene carbonate-dimethoxyethane-lithium tetrafluoroborate/carbon fibers)
 IT Anodes
 (battery, carbon fibers and natural graphite as neg. electrodes for lithium ion-type batteries)
 IT Pitch
 (mesophase, precursor for carbon fibers; carbon fibers and natural graphite as neg. electrodes for lithium ion-type batteries)
 IT 12192-58-4 39448-96-9, Graphite lithium
 RL: DEV (Device component use); USES (Uses)
 (carbon fibers and natural graphite as neg. electrodes for lithium ion-type batteries)
 IT 7782-42-5, Graphite, uses
 RL: DEV (Device component use); USES (Uses)
 (natural and pyrolytic; carbon fibers and natural graphite as neg. electrodes for lithium ion-type batteries)
 IT 25014-41-9, Polyacrylonitrile
 RL: NUU (Other use, unclassified); USES (Uses)
 (precursor for carbon fibers; carbon fibers and natural graphite as neg. electrodes for lithium ion-type batteries)
 L35 ANSWER 38 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN
 AN 1994:58595 HCAPLUS
 DN 120:58595
 ED Entered STN: 05 Feb 1994
 TI Secondary nonaqueous batteries and manufacture of anodes for the batteries
 IN Ito, Zenichiro; Ozaki, Yoshuki; Morita, Teruyoshi; Yamaura, Junichi
 PA Matsushita Electric Ind Co Ltd, Japan
 SO Jpn. Kokai Tokkyo Koho, 10 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 IC ICM H01M004-04
 ICS H01M004-02; H01M004-58

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 05290833	A2	19931105	JP 1992-90534	19920410
	JP 3191394	B2	20010723		
	US 5344724	A	19940906	US 1993-42794	19930406

PRAI JP 1992-90534 A 19920410

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 05290833	ICM	H01M004-04
	ICS	H01M004-02; H01M004-58
	IPCI	H01M0004-04 [ICM,5]; H01M0004-02 [ICS,5]; H01M0004-58 [ICS,5]
US 5344724	IPCI	H01M0004-58 [ICM,5]; H01M0006-14 [ICS,5]
	NCL	429/094.000; 429/231.300; 429/231.800
	ECLA	H01M004/58E2; H01M010/40

AB Mesophase granules sepd. from the melted pitch is carbonized and graphitized at 2500-2900° to form graphite granules, mixed with a binder, applied on collectors, and pressed to obtain the title anodes having 25-40% porosity. The batteries use Li-contg. metal oxide-based cathodes and graphite anodes, where the graphite has interplanar spacing d002 3.365-3.390 Å, unit cell length Lc 200-650 Å, and I1360/I1580 = 0.20.apprx.0.40 (I1360 and I1580 are the intensities of peaks at 1360 and 1580/cm, resp., on the Ar laser Raman spectrum of the graphite).

ST lithium battery graphite anode

IT Carbonaceous materials

RL: USES (Uses)
(graphitized, specifications and manuf. of, for lithium battery anodes)

IT Anodes
(battery, lithium, graphitized carbonaceous materials for, specifications and prepn. of)

IT 7782-42-5, Graphite, uses
RL: DEV (Device component use); USES (Uses)
(for anodes, specifications and manuf. of, for lithium batteries)

L35 ANSWER 39 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN

AN 1993:630107 HCAPLUS

DN 119:230107

ED Entered STN: 27 Nov 1993

TI Secondary organic-electrolyte batteries

IN Yasunami, Shoichiro; Kagawa, Okimasa; Maekawa, Yukio

PA Fuji Photo Film Co Ltd, Japan

SO Jpn. Kokai Tokkyo Koho, 12 pp.
CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01M004-58

ICS H01M004-02; H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 05174820	A2	19930713	JP 1991-338959	19911220
	JP 3239302	B2	20011217		
PRAI	JP 1991-338959		19911220		

CLASS

	PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
	JP 05174820	ICM	H01M004-58
		ICS	H01M004-02; H01M010-40
		IPCI	H01M0004-58 [ICM,5]; H01M0004-02 [ICS,5]; H01M0010-40 [ICS,5]
		ECLA	H01M004/48B2; H01M004/52B2; H01M004/58E; H01M004/58E2
AB	The batteries have Li-contg. transition metal chalcogenide cathodes and carbonaceous anodes, where the anodes are composed of fine low-graphitization C powder having unit cell length Lc 8-150Å, interplanar spacing d002 3.42-3.65Å, real d. 1.60-2.20 g/cm ³ and/or fine carbon fibers. The C powder may be carbonized polyacrylonitrile, coal-based coke, mesophase pitch, or carbon black; and the carbon fibers may be fibrous graphite. The chalcogenide may be LiaCobVcOd (a=0.1-1.1, b=0.15-0.9, c=1-b, d=2-2.5) or LiaCobNicOd.		
ST	lithium battery carbonaceous anode; transition metal lithium oxide cathode		
IT	Carbon black, uses Coke RL: USES (Uses) (anodes contg., lithium-intercalating, for batteries)		
IT	Batteries, secondary (lithium-intercalating carbon/lithium transition metal chalcogenide)		
IT	Carbon fibers, uses RL: USES (Uses) (graphite, anodes contg., lithium-intercalating, for batteries)		
IT	Pitch (mesophase, anodes contg., lithium-intercalating, for batteries)		
IT	9003-54-7D, pyrolyzed 25014-41-9D, Polyacrylonitrile, pyrolyzed RL: USES (Uses) (anodes contg., lithium-intercalating, for batteries)		
IT	7439-93-2, Lithium, uses RL: USES (Uses) (anodes from carbonaceous materials intercalated with, for batteries)		
IT	7440-44-0 7782-42-5 RL: USES (Uses) (carbon fibers, graphite, anodes contg., lithium-intercalating, for batteries)		
IT	147521-85-5, Cobalt lithium vanadium oxide (Co _{0.5} Li _{0.5} V _{0.5} O _{2.5}) 151028-39-6, Cobalt lithium nickel oxide (Co _{0.5} Li _{0.5} Ni _{0.5} O _{2.5}) RL: DEV (Device component use); USES (Uses) (cathodes, for batteries)		

L35 ANSWER 40 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN

AN 1994:139205 HCAPLUS

DN 120:139205

ED Entered STN: 19 Mar 1994

TI Lithium secondary battery and method of manufacturing carbonaceous anode materials

IN Takami, Norio; Satoh, Asako; Ohsaki, Takahisa
 PA Toshiba Corp., Japan
 SO Eur. Pat. Appl., 52 pp.
 CODEN: EPXXDW
 DT Patent
 LA English
 IC ICM H01M004-58
 ICS H01M010-40
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 573266	A1	19931208	EP 1993-304258	19930601
	EP 573266	B1	19991208		
	R: DE, FR, GB				
	JP 06168725	A2	19940614	JP 1993-56194	19930316
	JP 3241850	B2	20011225		
	JP 06275321	A2	19940930	JP 1993-58565	19930318
	JP 3162531	B2	20010508		
	US 5340670	A	19940823	US 1993-69424	19930601
	KR 134638	B1	19980515	KR 1993-9983	19930601
PRAI	JP 1992-140247	A	19920601		
	JP 1992-261418	A	19920930		
	JP 1993-56194	A	19930316		
	JP 1993-58565	A	19930318		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
EP 573266	ICM	H01M004-58
	ICS	H01M010-40
	IPCI	H01M0004-58 [ICM,5]; H01M0010-40 [ICS,5]
	ECLA	H01M004/58E2; H01M010/40
JP 06168725	IPCI	H01M0004-58 [ICM,5]; H01M0004-02 [ICS,5]; H01M0010-40 [ICS,5]
JP 06275321	IPCI	H01M0010-40 [ICM,5]; H01M0004-02 [ICS,5]; H01M0004-58 [ICS,5]
US 5340670	IPCI	H01M0010-40 [ICM,5]
	NCL	429/331.000; 423/445.000R; 423/448.000; 429/231.500; 429/231.800; 429/330.000; 429/332.000
KR 134638	IPCI	H01M0004-02 [ICM,6]

AB The lithium secondary battery includes a **cathode** housed in a case, an anode housed in the case and contg. a carbonaceous material with exothermic peak at $\geq 700^\circ$ when measured by a differential thermal anal. and an intensity ratio P101/P100 of a (101) diffraction peak P101 to a (100) diffraction peak P100 of a **graphite** structure, obtained by x-ray diffraction anal., of 0.7 to 2.2, and absorbs lithium ions, a separator housed in the case so as to be arranged between the pos. and neg. **electrodes**, and a nonaq. electrolyte contained in the case. The battery has high capacity and excellent charge-discharge efficiency, cycle life,

flatness of a discharge voltage, and rapid charge-discharge cycle characteristics.

ST lithium battery carbon anode

IT Rubber, butadiene-styrene, uses
RL: PREP (Preparation)
(in carbon anode prepn. for nonaq. secondary lithium batteries)

IT Carbon black, uses
RL: USES (Uses)
(in nonaq. secondary lithium batteries with carbon anode)

IT Batteries, secondary
(lithium, nonaq., with carbon anode)

IT **Pitch**
(**mesophase**, in carbon anode prepn. for nonaq. secondary lithium batteries)

IT 9004-32-4, Cmc
RL: USES (Uses)
(in carbon anode prepn. for nonaq. secondary lithium batteries)

IT 75-05-8, Acetonitrile, uses 75-52-5, Nitromethane, uses 79-20-9, Methyl acetate 96-48-0, γ -Butyrolactone 96-49-1, Ethylene carbonate 98-95-3, Nitrobenzene, uses 105-58-8, Diethyl carbonate 107-21-1, Ethylene glycol, uses 108-32-7, Propylene carbonate 108-88-3, Toluene, uses 141-78-6, Ethyl acetate, uses 616-38-6, Dimethyl carbonate 1330-20-7, Xylene, uses 7429-90-5, Aluminum, uses 7440-02-0, Nickel, uses 7440-50-8, Copper, uses 7782-50-5, Chlorine, uses 7791-03-9, Lithium perchlorate 9002-84-0, Ptfе 9010-79-1, Ethylene-propylene copolymer 12597-68-1, Stainless steel, occurrence 14283-07-9, Lithium borofluoride 21324-40-3 29935-3 5-1 33454-82-9 39300-70-4, Lithium nickel oxide 39457-42-6, Lithium manganese oxide 52627-24-4, Lithium cobalt oxide 90076-65-6, Lithium bistrifluoromethylsulfonylimide
RL: USES (Uses)
(in nonaq. secondary lithium batteries with carbon anode)

IT 9003-55-8
RL: USES (Uses)
(rubber, in carbon anode prepn. for nonaq. secondary lithium batteries)

L35 ANSWER 41 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN

AN 1993:201212 HCAPLUS

DN 118:201212

ED Entered STN: 14 May 1993

TI Manufacture of artificial graphite electrodes for electrolytic steel manufacture

IN Kanbe, Masazumi; Noda, Tomoyoshi; Miwa, Shigeru

PA Nippon Steel Chemical Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 5 pp.
CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM C25C007-02
ICS C01B031-04; C04B035-54

CC 72-2 (**Electrochemistry**)
Section cross-reference(s): 55

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	-----	---	-----	-----	
PI	JP 04285189	A2	19921009	JP 1991-70316	19910312
PRAI	JP 1991-70316		19910312		

CLASS
PATENT NO. CLASS PATENT FAMILY CLASSIFICATION CODES

JP 04285189 ICM C25C007-02
ICS C01B031-04; C04B035-54
IPCI C25C0007-02 [ICM,5]; C01B0031-04 [ICS,5];
C04B0035-54 [ICS,5]

AB In the manuf. of artificial **graphite electrodes**
using needle coke and binder **pitch** as starting materials,
 β resin conc. is added when needle coke and binder
pitch are kneaded and heated or before the kneading and
heating it is added to binder **pitch** and/or needle coke,
thereby the content of β resin in the entire blend is adjusted
to 6-10 wt.%. The β resin conc. is obtained from the extn. of
coal tar or coal tar **pitch**es by arom. hydrocarbon solvents
and contains ash ≤ 0.1 wt.% and quinoline-sol. but
toluene-insol matter ≥ 50 wt.% followed by pulverization. The
content of β resin is a kneaded mixt. of starting materials can
be adjusted easily and it is unnecessary to carry out excessive
thermal modification which can bring about softening point rising or
formation of **mesophase** by the increase of β resin in
binder **pitch** so that workability becomes better and
artificial **graphite electrodes** having improved
properties can be obtained just by adjusting the amt. of β
resin conc. to be added.

ST graphite electrode beta resin adjustment; coke needle binder pitch
graphite electrode; steel electrochem prepn graphite electrode

IT Electrodes
(graphite, artificial, prepn. of, from needle coke and binder
pitch for steel making)

IT Polymers, uses
RL: USES (Uses)
(β -, in artificial graphite electrodes manuf., phys.
properties of electrodes in relation to)

IT 7782-42-5P, Graphite, uses
RL: PREP (Preparation)
(electrodes, artificial, prepn. of, from needle coke and binder
pitch)

IT 12597-69-2P, Steel, preparation
RL: PREP (Preparation)
(manuf. of, electrolytic, artificial graphite electrode for)

L35 ANSWER 42 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 1991:252629 HCAPLUS
DN 114:252629
ED Entered STN: 28 Jun 1991
TI Manufacture of graphite **electrode nipples**
IN Griffin, Robert R.; Roussel, Keith M.; Fu, Ta Wei
PA Conoco, Inc., USA
SO U.S., 5 pp. cont.-in-part of U.S. Ser. No. 210,689, abandoned.
CODEN: USXXAM
DT Patent
LA English
IC ICM C01B031-00
INCL 264029500
CC 57-8 (Ceramics)
Section cross-reference(s): 55

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	-----
PI US 4998709	A	19910312	US 1990-513468	

JP 04230994 A2 19920819 JP 1991-59588 199004
19
JP 3351540 B2 20021125 199102
PRAI US 1988-210689 B2 19880623 28
US 1990-513468 A 19900419

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 4998709	ICM	C01B031-00
	INCL	264029500
	IPCI	C01B0031-00 [ICM,5]
	NCL	264/029.500; 029/825.000; 264/029.700; 264/105.000; 264/108.000; 373/092.000; 403/DIG.005; 428/408.000
JP 04230994	IPCI	H05B0007-14 [ICM,5]; C25B0009-02 [ICA,5]
AB		Graphite nipples suitable for connecting graphite electrodes used in steelmaking are prep'd. by adding 8-20 wt.% C fibers produced from spun mesophase pitch to 45-65 wt.% premium coke and 22-28 wt.% binder to form an extrusion blend, extruding the extrusion blend to form an elongated C nipple, and subjecting the C nipple to 760-982° for 2-5 wk then to .gtorsim.2704° for 5-14 days. The graphitized C fibers of the graphite nipples have tensile strength (200-300) + 103 psi and Young's modulus of elasticity (55-120) + 106 psi.
ST		graphite electrode joint prepn steelmaking; mesophase pitch graphite electrode joint ; coke graphite electrode joint ; carbon fiber graphite electrode joint
IT		Joints, mechanical (electrodes, graphite nipples for, prepn. of, mesophase pitch -based carbon fibers in, for high strength)
IT		Coke RL: SPN (Synthetic preparation); PREP (Preparation) (in graphite electrode joint prepn. from mesophase pitch -based carbon fibers)
IT		Pitch (coal-tar, in graphite electrode joint prepn. from mesophase pitch -based carbon fibers)
IT		Electrodes (furnace, graphite nipples for, manuf. of, for steelmaking)
IT		Pitch (mesophase, carbon fibers from, manuf. of, in graphite electrode joint prepn.)
IT		Carbon fibers, uses and miscellaneous RL: SPN (Synthetic preparation); PREP (Preparation) (pitch -based, mesophase, in graphite electrode joint prepn.)
IT		7440-44-0 7782-42-5 RL: USES (Uses) (carbon fibers, pitch -based, mesophase, in graphite electrode joint prepn.)
IT		1332-37-2, Iron oxide, uses and miscellaneous RL: USES (Uses) (in graphite electrode joint prepn. from mesophase pitch -based carbon fibers)

L35 ANSWER 43 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN

AN 1990:636597 HCAPLUS
 DN 113:236597
 ED Entered STN: 22 Dec 1990
 TI Manufacture of graphite products with high density and strength, and
 graphite **electrodes** for electric-discharge machining
 IN Fukuda, Noriyoshi; Hagiwara, Kiyoshi; Torii, Takayuki; Nagayama,
 Katsuhiko
 PA Kawasaki Steel Corp., Japan
 SO Jpn. Kokai Tokkyo Koho, 11 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 IC ICM C04B035-54
 ICS B23H001-08; C10C003-00
 CC 57-8 (Ceramics)

FAN.CNT 1		PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 02088464	A2	19900328	JP 1988-163626	19880630	

PRAI	JP 1988-33750	A1	19880216
	JP 1988-136590	A1	19880602

CLASS		
PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 02088464	ICM	C04B035-54
	ICS	B23H001-08; C10C003-00
	IPCI	C04B0035-54 [ICM,5]; B23H0001-08 [ICS,5]; C10C0003-00 [ICS,5]

AB The title **graphite** products (or **electrodes**) are
 manufd. by mixing **mesophase** C beads with ≤ 40 wt.%
 mixt. contg. 100 wt. parts **graphite** and/or coke and 30-120
 wt. parts **pitch** contg. from 40 to < 95 wt.% C6H6 insols.,
 molding, firing, and graphitizing.

ST **mesophase** carbon **pitch** coke **graphite**
 product; **electrode** **graphite** elec discharge
 machining

IT Pitch
 (graphite products from mesophase carbon and coke and, with high
 d. and strength)

IT Coke
 RL: USES (Uses)
 (graphite products from mesophase carbon and pitch and, with high
 d. and strength)

IT Electrodes
 (graphite, manuf. of, for elec.-discharge machining)

IT Machining
 (elec.-discharge, **graphite electrodes** for,
 manuf. of high-d. and -strength, from **mesophase** carbon
 and coke and **pitch**)

IT 7440-44-0, Carbon, uses and miscellaneous
 RL: USES (Uses)
 (mesophase, graphite products from coke and pitch and, with high
 d. and strength)

IT 7782-42-5, Graphite, uses and miscellaneous
 RL: USES (Uses)
 (products, with high d. and strength, from mesophase carbon and
 coke and pitch)

L35 ANSWER 44 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN

AN 1989:234523 HCAPLUS
 DN 110:234523
 ED Entered STN: 25 Jun 1989
 TI **Mesophase pitch for graphite electrode production**
 IN Matsubara, Kenji; Okuyama, Yasuo; Ueno, Ichiro
 PA Nippon Kokan K. K., Japan
 SO Jpn. Kokai Tokkyo Koho, 3 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 IC ICM C10C003-04
 ICS C10C003-10
 ICA C04B041-82; C10C003-02
 CC 51-19 (Fossil Fuels, Derivatives, and Related Products)
 FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 63278995	A2	19881116	JP 1987-114009	19870511
JP 04038790	B4	19920625		
PRAI JP 1987-114009		19870511		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 63278995	ICM	C10C003-04
	ICS	C10C003-10
	ICA	C04B041-82; C10C003-02
	IPCI	C10C0003-04 [ICM,4]; C10C0003-10 [ICS,4]; C04B0041-82 [ICA,4]; C10C0003-02 [ICA,4]

AB The title pitch is manufd. by hydrogenating petroleum pitch or coal-tar pitch, mixing 5-40% light oil with the hydrogenated pitch and heating the mixt. under inert atm. environment to obtain a mesophase pitch product. The light oil has an av. mol. wt. of 100-500 and contains mainly 2-6-ring arom. components. Thus, a coal-tar pitch was catalytically hydrogenated, mixed with 25% light oil (b. 540°), and heated at 400° under N for .apprx.2 h to obtain a mesophase pitch with viscosity 0.25 P.
 ST **pitch mesophase graphite electrode prodn; coal tar pitch hydrogenation mesophase**
 IT **Electrodes**
 (graphite, prodn. of, mesophase pitch for)
 IT **Pitch**
 (mesophase, manuf. of, from coal-tar pitch, for graphite electrode prodn.)

L35 ANSWER 45 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN
 AN 1989:176541 HCAPLUS
 DN 110:176541
 ED Entered STN: 12 May 1989
 TI Coal-tar pitch for graphite electrode production
 IN Sato, Maki; Matsui, Yoshiaki; Yamada, Masahiro; Fujimoto, Kenichi
 PA Nippon Steel Corp., Japan; Nippon Steel Chemical Co., Ltd.
 SO Jpn. Kokai Tokkyo Koho, 8 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 IC ICM C10C003-04

ICS C01B031-00; C10C003-10
 CC 51-19 (Fossil Fuels, Derivatives, and Related Products)
 FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 63256690	A2	19881024	JP 1987-90673	19870415
JP 06072224	B4	19940914		
PRAI JP 1987-90673		19870415		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 63256690	ICM	C10C003-04
	ICS	C01B031-00; C10C003-10
	IPCI	C10C0003-04 [ICM,4]; C01B0031-00 [ICS,4]; C10C0003-10 [ICS,4]

AB The title pitch is prepd. by (a) contacting the coal-tar pitch with a hydrogenation catalyst at 300-500° to obtain a hydrogenated pitch having an H absorption amt. 5 g/kg pitch feed and the denitrogenation efficiency ≤80 wt.%; and (b) heat-soaking the hydrogenated pitch at 350-450° under N for 0.5-10 h, preferably 4-6 h to obtain a mesophase pitch product. Thus, a coal-tar pitch (softening point 31.6°, contg. MePh-insols. 6.8, quinoline-insols. trace, fixed C 31.8, and N 1.46 wt.%) was contacted with a Ni-Mo/Al₂O₃ catalyst at 398°, 150 kg/cm² and 1.98 h-1 liq. space velocity to obtain a soft hydrogenated pitch, which was then heated under N in an autoclave at 380° for 5 h to obtain a mesophase pitch having softening point 90.6°, contg. MePh-insols. 29.6, quinoline-insols. 9.8 and fixed C 57.1 wt.%.
 ST coal tar pitch mesophase manuf; graphite
 electrode mesophase pitch hydrogenation;
 nickel molybdenum catalyst pitch hydrogenation
 IT Pitch
 (mesophase, manuf. of, from coal-tar pitch,
 by hydrogenation and heat-soaking, for graphite
 electrode prodn.)
 IT 7439-98-7, Molybdenum, uses and miscellaneous 7440-02-0, Nickel,
 uses and miscellaneous
 RL: CAT (Catalyst use); USES (Uses)
 (catalyst contg., in hydrogenation of coal-tar pitch)

L35 ANSWER 46 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN
 AN 1989:176540 HCAPLUS
 DN 110:176540
 ED Entered STN: 12 May 1989
 TI Coal-tar pitch for graphite electrode production
 IN Matsui, Yoshiaki; Sato, Maki; Yamada, Masahiro; Fujimoto, Kenichi
 PA Nippon Steel Corp., Japan; Nippon Steel Chemical Co., Ltd.
 SO Jpn. Kokai Tokkyo Koho, 9 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 IC ICM C10C003-02
 ICS C01B031-00; C10C003-10
 CC 51-19 (Fossil Fuels, Derivatives, and Related Products)
 FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI JP 63256689 A2 19881024 JP 1987-90674 198704
15

JP 06072226 B4 19940914
PRAI JP 1987-90674 19870415

CLASS
PATENT NO. CLASS PATENT FAMILY CLASSIFICATION CODES

JP 63256689 ICM C10C003-02
ICS C01B031-00; C10C003-10
IPCI C10C0003-02 [ICM,4]; C01B0031-00 [ICS,4];
C10C0003-10 [ICS,4]

AB The title pitch is manufd. by blending the pitch feed with
≥10 wt.% alcs., heat-soaking the mixt. at
≥250°, and distg. the reaction product to obtain a
mesophase pitch with lower softening point. The heat-soaking is
preferably carried out at 330-450° for 1-10 h. Thus, 100 wt.
parts coal-tar pitch and 45 wt. parts 2-propanol were fed into an
autoclave, heated under air, and then N atm. at 360° and 150
kg/cm2 for 5 h to obtain a mesophase pitch with softening point
89.6° vs. 91.2° for a conventional method.

ST coal tar pitch mesophase electrode;
propanol pitch mesophase graphite
electrode

IT Pitch
(mesophase, manuf. of, from coal-tar pitch,
by heat-soaking in presence of alcs., for graphite
electrode prodn.)

IT 67-63-0, 2-Propanol, uses and miscellaneous 107-21-1, Ethylene
glycol, uses and miscellaneous 141-43-5, Ethanolamine, uses and
miscellaneous

RL: USES (Uses)

(coal-tar pitch heat soaking with, in prepn. of
mesophase pitch, for graphite
electrode prodn.)

L35 ANSWER 47 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN

AN 1988:476486 HCAPLUS

DN 109:76486

ED Entered STN: 02 Sep 1988

TI Method for manufacture of carbonaceous feedstock powders used in the
production of high-density graphite electrodes

IN Wakasa, Tsutomu; Ono, Taku; Yamamoto, Tsuneo; Wakabayashi, Takashi

PA Nippon Denkyoku K. K., Japan

SO Jpn. Kokai Tokkyo Koho, 6 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM C01B031-02

CC 51-19 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 57

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 63089413	A2	19880420	JP 1986-233821	198610 01

PRAI JP 1986-233821 19861001

CLASS
PATENT NO. CLASS PATENT FAMILY CLASSIFICATION CODES

JP 63089413 ICM C01B031-02

IPCI C01B0031-02 [ICM,4]

AB The title method comprises (a) bubbling molten coal-tar pitch with N gas at 300-420° to remove volatile org. components in a 1st reforming stage; (b) heating the reformed pitch at 400-450°, and then atomizing through a spray nozzle under N atm. to obtain a reformed pitch powder (av. diam. 1-100 µm); (c) contacting the reformed pitch powder with hot air in a fluidized bed at 200-300° to form a high m.p. pitch powder in a 2nd reforming stage; and (d) heating the high m.p. pitch powder under N at 480-550° for 0.5-3 h to obtain mesophase pitch product useful in the prodn. of high-d. graphite electrodes.

ST coal tar pitch mesophase manuf; graphite electrode mesophase pitch

IT Pitch
(mesophase, manuf. of, from coal-tar pitch, for graphite electrode prodn.)

IT 7782-42-5P, uses and miscellaneous
RL: PREP (Preparation)
(electrodes, prodn. of, mesophase pitch prepn. in)

L35 ANSWER 48 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN

AN 1986:556186 HCAPLUS

DN 105:156186

ED Entered STN: 01 Nov 1986

TI Graphite-base plates

IN Takahashi, Kunimasa; Kameda, Takashi; Shibatani, Haruo

PA Mitsubishi Petrochemical Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 7 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM C04B035-54

ICS C01B031-04

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 51, 57

FAN.CNT 4

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	-----	---	-----	-----	
PI	JP 61077667	A2	19860421	JP 1984-199737	198409 25
	US 4929404	A	19900529	US 1988-196760	198805 17
PRAI	JP 1984-199737	A	19840925		
	JP 1984-255270	A	19841203		
	JP 1985-63329	A	19850329		
	JP 1985-87264	A	19850423		
	US 1985-779590	B1	19850924		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
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JP 61077667	ICM	C04B035-54
	ICS	C01B031-04
	IPCI	C04B0035-54 [ICM,4]; C01B0031-04 [ICS,4]
US 4929404	IPCI	C10C0003-00 [ICM,5]; B29C0043-52 [ICS,5]

NCL 264/029.500; 208/044.000; 264/029.100;
264/029.700; 264/101.000; 264/DIG.020

- AB The mold-formed plates have elec. resistivity ≤ 5.0 m Ω -cm and bending strength ≥ 200 kg/cm², and they show vol. and wt. change $\leq 3\%$ when heated at 1000° to be carbonized. Powder materials (max. m.p. 400°, carbonizing yield $\geq 70\%$ at 1000°) of **graphite** and **pitch** contg. $\leq 70\%$ quinoline-insol. component and $\geq 40\%$ **mesophase** are compacted and fired in inert atm. at $\geq 700^\circ$. The dimensionally stable plates are useful as **electrode** substrates and separators of fuel cells. Thus, 630 g tar (b.p. $\geq 170^\circ$, thermal decompn. residue of naphtha) was treated with H at 120 kg/cm² and 460° in the presence of cracking catalysts (Al₂O₃-SiO₂), filtered, and distd. at $\leq 490^\circ$ to give reformed **pitch** in 25%. The **pitch** (10 g) was placed in a reaction vessel, treated with 1,2,3,4-tetrahydroquinoline (I) under an Ar flow for 10 min, immersed in a molten salt bath at 485° while I and Ar were supplied to the liq. **pitch** to give **pitch** (in 52% yield) contg. 100 **mesophase** and 45% quinoline-insol. component. The **mesophase**-contg. **pitch** (1.34 g) was mixed with 8.0 g CPB flake **graphite**, ground, and 1.70 g of the mixt. was packed into a metal mold and precompacted at 1.5 ton/cm² and 340°. The green compact was held at 1000° under an Ar flow for 30 min to give 1.67 g **graphite**-base plate having bulk d. 2.1 g/mL, vol. shrinkage 0.6%, wt. decrease 1.7% (based on the green compact), elec. resistivity 1.2 m Ω -cm, and bending strength 550 kg/cm².
- ST **graphite pitch fuel cell electrode; separator fuel cell graphite pitch; resistance graphite pitch plate**
- IT **Electric resistance**
(of graphite plates, for fuel-cell electrodes and separators)
- IT **Fuel cells**
(separators graphite plates for, pitch-bonded stable and high-d.)
- IT **Electrodes**
(fuel-cell, graphite plates for, pitch-bonded stable, and high d.)
- IT **Pitch**
(petroleum, **mesophase**, binders, for **graphite** plates, for fuel-cell **electrodes** and separators)
- IT **7782-42-5P, preparation**
RL: PREP (Preparation)
(manuf. of plates contg., with **mesophase**-contg. **pitch** binder, for fuel-cell **electrodes** and separators)

L35 ANSWER 49 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN

AN 1985:426257 HCAPLUS

DN 103:26257

ED Entered STN: 27 Jul 1985

TI Formed carbon as **electrodes**

PA Koa Oil Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 6 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM C01B031-04

CC 57-8 (Ceramics)

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI JP 60016806 A2 19850128 JP 1983-122565 198307
06

JP 01023405 B4 19890502
PRAI JP 1983-122565 19830706

CLASS

PATENT NO. CLASS PATENT FAMILY CLASSIFICATION CODES

JP 60016806 ICM C01B031-04
IPCI C01B0031-04 [ICM,4]

AB To graphitize effectively, a bulk mesophase material (A) (i.e. mesocarbon microbeads prep'd. by heating heavy oil at 400-500° and sepg.) is mixed at ≤20% with coal or petroleum pitch as binder (or with acicular coke or their mixt.). Thus, coal-tar pitch (softening temp. 109°, fixed C 56, quinoline-insolubles 4.2%) was mixed with 3 or 10% A -60 mesh, kneaded with com. needle petroleum coke (8-20, 20-35, and -100 mesh 30, 10, and 60%, resp.) in a 28:100 ratio at 160° for 1 h, extruded at 130°, heated at 200°/h to and at 1000° for 1 h, and then to 2800° to graphitize. The d. was 1.51 or 1.54, Young's modulus 730 or 890, bending strength 100 or 120 kg/mm², elec. resistivity (+ 10⁻³ Ω-cm) 0.9 each, thermal expansion coeff. 0.46 or 0.49 + 10⁻⁶/degree, and the calcd. thermal shock resistance 920 or 860 cal/cm-s, compared to 1.48, 690, 90, 1.0, 0.45, and 860, resp., with A.

ST carbon mesophase material graphitization electrode

IT Electrodes
(graphite, mesophase microbead additives in manuf. of)

IT Graphitization
(of carbon, mesophase microbead additives in, for electrodes)

IT Pitch
(coal-tar, graphite electrode manuf. from, mesophase microbead additives in)

IT Spheres
(micro-, mesophase carbon, in graphite electrode manuf.)

IT Coke
RL: USES (Uses)
(petroleum, graphite electrode manuf. from, mesophase microbead additives in)

IT 7440-44-0, properties
RL: RCT (Reactant); RACT (Reactant or reagent)
(graphitization of, mesophase microbead additive in, for electrodes)

L35 ANSWER 50 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN

AN 1979:576486 HCAPLUS

DN 91:176486

ED Entered STN: 12 May 1984

TI Elastomer piezoresistors

IN Kanamori, Katsuhiko

PA Yokohama Rubber Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 9 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC C08K007-00; H01B001-04

CC 38-9 (Elastomers, Including Natural Rubber)
Section cross-reference(s): 76

FAN.CNT 2

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	----- JP 54080350	A2	19790627	JP 1977-148045	197712 12
	JP 56009187	B4	19810227		
	GB 1561189	A	19800213	GB 1977-53596	197712 22
	CA 1096161	A1	19810224	CA 1977-293761	197712 22
	NL 7714355	A	19780627	NL 1977-14355	197712 23
	NL 190556	B	19931116		
	NL 190556	C	19940418		
	DE 2757870	A1	19780629	DE 1977-2757870	197712 23
	DE 2757870	C2	19870813		
	FR 2375698	A1	19780721	FR 1977-39231	197712 26
	FR 2375698	B1	19830429		
	US 4273682	A	19810616	US 1979-83367	197910 10
PRAI	JP 1976-155107	A	19761224		
	JP 1977-148045	A	19771212		
	US 1977-862855	A1	19771212		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 54080350	IC	C08K0007-00; H01B001-04
	IPCI	C08K0007-00; H01B0001-04
GB 1561189	IPCI	C08K0007-00
CA 1096161	IPCI	H01B0001-00
NL 7714355	IPCI	C08K0009-00; C08K0003-04; H01C0010-12; H01B0017-64
DE 2757870	IPCI	C08K0007-18
FR 2375698	IPCI	H01C0010-10; B32B0019-02; C08K0003-04; C08K0007-00; C08L0027-06; C08L0083-04
US 4273682	IPCI	H01B0001-06
	NCL	252/511.000; 338/114.000

AB Rubbery polymers contg. powd. **synthetic graphite** having degree of roundness (Wadell) >0.5 are useful as piezoresistors. Thus, a compn. of KE 640-U (silicone rubber) 100, crushed and ground **synthetic graphite** (60-105 μ , degree of roundness 0.72) 70, and peroxide 3.4 parts was rolled and vulcanized to give a 0.5-mm sheet. When the sheet was tested for piezoresistivity between a flat **electrode** and a 3-mm-diam. rod **electrode** (max. pressure 1 kg), there was no noise for >106 cycles, compared with <103 cycles for a similar compn. contg. crushed **synthetic graphite** of degree of roundness 0.25.

ST silicone rubber graphite composite; piezoresistance silicone rubber composite; **roundness** degree **graphite**

IT Rubber, silicone, uses and miscellaneous
RL: USES (Uses)
(piezorsistors, contg. powd. graphite)

IT Piezoresistors
(powd. graphite-contg. rubber)

IT 7782-42-5, uses and miscellaneous
 RL: USES (Uses)
 (piezoresistors contg., rubber-based)
 IT 9002-86-2
 RL: USES (Uses)
 (piezoresistors, contg. powd. graphite)

L35 ANSWER 51 OF 53 HCAPLUS COPYRIGHT 2005 ACS on STN
 AN 1976:484759 HCAPLUS
 DN 85:84759
 ED Entered STN: 12 May 1984
 TI Improved graphite articles with low thermal expansion coefficients
 IN Singer, Leonard S.; Lewis, Irwin Charles
 PA Union Carbide Corp., USA
 SO Ger. Offen., 23 pp.
 CODEN: GWXXBX
 DT Patent
 LA German
 IC C04B; C25B
 CC 72-7 (Electrochemistry)
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	DE 2542953	A1	19760408	DE 1975-2542953	197509 26
	DE 2542953	B2	19790104		
	DE 2542953	C3	19790830		
	CA 1060161	A1	19790814	CA 1975-234616	197508 29
	AU 7585172	A1	19770331	AU 1975-85172	197509 25
	BE 833903	A1	19760326	BE 1975-160447	197509 26
	DK 7504337	A	19760328	DK 1975-4337	197509 26
	SE 7510818	A	19760329	SE 1975-10818	197509 26
	SE 415094	B	19800908		
	SE 415094	C	19810108		
	NL 7511384	A	19760330	NL 1975-11384	197509 26
	NO 7503281	A	19760330	NO 1975-3281	197509 26
	NO 140716	C	19791024		
	NO 140716	B	19790716		
	FR 2286107	A1	19760423	FR 1975-29677	197509 26
	FR 2286107	B1	19800725		
	JP 51063809	A2	19760602	JP 1975-116292	197509 26
	JP 54026235	B4	19790903		

ZA 7506130	A	19760929	ZA 1975-6130	197509 26
ES 441286	A1	19770401	ES 1975-441286	197509 26
CH 605466	A	19780929	CH 1975-12516	197509 26
GB 1526809	A	19781004	GB 1975-39441	197509 26
AT 7507375	A	19830615	AT 1975-7375	197509 26

AT 373566	B	19840210
PRAI US 1974-510039	A	19740927

CLASS PATENT NO. CLASS PATENT FAMILY CLASSIFICATION CODES

DE 2542953	IC	C04B; C25B
	IPCI	C04B0035-54; C25B0011-12
CA 1060161	IPCI	C01B0031-00
AU 7585172	IPCI	C09C0001-46
BE 833903	IPCI	C04B
DK 7504337	IPCI	C25B
SE 7510818	IPCI	C01B0031-04
NL 7511384	IPCI	C04B0035-54; C01B0031-04; C25B0011-12
NO 7503281	IPCI	C04B
FR 2286107	IPCI	C01B0031-04; H05B0031-08
JP 51063809	IPCI	C04B0035-64; C01B0031-04
ZA 7506130	IPCI	C10B
ES 441286	IPCI	C10B; B29F
CH 605466	IPCI	C04B0035-54
GB 1526809	IPCI	C01B0031-04
AT 7507375	IPCI	C01B0031-04

AB The title materials are applicable to the fabrication of electrodes for high temp. operation. Thus, from a com. petroleum pitch was made a pitch with a mesophase content of 57%, a d. of 1.24 and a softening point of 120°. The chem. anal. was C 93.3, H 5.63, S 1.0 and ash 0.15%. (The quinoline-insol. content was 0.5%). The mesophase pitch was made by heating pitch for 15 hr at a temp. of .apprx.400° after which heating the pyridine insol. content was 57%, thus the pitch had a mesophase content of .apprx.57%. Fibers of 15 µm were spun at 390° in a N atm. and part were heated for 1 hr in an air-atm. furnace to 275° and held at this temp. for an addnl. hr to heat harden. The hardened fibers (.apprx.300g) were cut in 2.54 cm lengths, placed in a Pyrex beaker and in a sagger slowly (60% hr) heated to 500°, held at this temp. for 3 hr and then cooled to room temp. The fibers were then heated to 1000° in a graphite crucible and for 5 hr held at this 1000°. The cooled fibers were powdered (.apprx.200 µm) and mixed with coal tar pitch (100 parts powder to 80 parts pitch) and this mixt. was extruded at a pressure of 7-14 kg/cm² to a rod 2cm in diam. The rod was heated to 1000° at 60°/hr, held-at this temp. for 2 hr then in .apprx.1 hr heated to 3000° and there held for 2 hr. The rod had a coeff. of thermal expansion of 0.67 + 10-6/°C.

ST graphite electrode thermal expansion

IT Pitch

(graphite electrodes, with low thermal expansion)

IT Electrodes
(graphite, from coal tar pitch, with low thermal expansion)

IT 7782-42-5, uses and miscellaneous
RL: USES (Uses)
(electrodes, from coal tar pitch, with low thermal expansion)

L35 ANSWER 52 OF 53 JAPIO (C) 2005 JPO on STN
AN 2004-127913 JAPIO
TI LITHIUM SECONDARY BATTERY
IN KATO FUMIO; OURA TAKAFUMI; FUKUMOTO YUSUKE; YAMAMOTO NORIHIRO;
FUJIWARA SHOZO
PA MATSUSHITA ELECTRIC IND CO LTD
PI JP 2004127913 A 20040422 Heisei
AI JP 2003-160969 (JP2003160969 Heisei) 20030605
PRAI JP 2002-223862 20020731
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol.
2004
IC ICM H01M004-02
ICS H01M002-02; H01M004-58; H01M004-62; H01M004-66; H01M010-40
AB PROBLEM TO BE SOLVED: To improve charge and discharge cycle characteristics of a high energy-density lithium secondary battery, and improve or maintain discharge rate characteristics, low-temperature discharge characteristics, and safety (heat resistance).
SOLUTION: The lithium secondary battery is prepared by using a negative **electrode** wherein active material composed of a mixture consisting of an **artificial graphite** particle A that has been obtained by kneading and granulating the base material made by crushing a bulk **mesophase pitch**, a **pitch**, and/or a thermosetting resin in a softened state and by making it carbonized/graphitized, and a spherical **graphite** particle B of which **circularity** is large, is fixed on the **copper** core material. This enables to improve the charge and discharge cycle characteristics of the high energy-density lithium secondary battery, and at the same time to provide the battery that is superior in the discharge rate characteristics, the low-temperature discharge characteristics, and safety (heat resistance).
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L35 ANSWER 53 OF 53 JAPIO (C) 2005 JPO on STN
AN 2000-156226 JAPIO
TI NEGATIVE **ELECTRODE** FOR BATTERY AND NONAQUEOUS ELECTROLYTE SECONDARY BATTERY
IN KOBAYASHI KOTARO; KOJIMA AKIRA
PA SHIN KOBE ELECTRIC MACH CO LTD
PI JP 2000156226 A 20000606 Heisei
AI JP 1998-327923 (JP10327923 Heisei) 19981118
PRAI JP 1998-327923 19981118
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2000
IC ICM H01M004-58
ICS H01M004-02; H01M004-62; H01M010-40
AB PROBLEM TO BE SOLVED: To prevent the delamination and cracking of a mixture layer while keeping high capacity without increasing a quantity of binding agent which inhibits the charging and discharging reaction, in a case when a rolled **copper** foil capable of providing high capacity and the lumped **graphite** powder easily causing the delamination of the mixture layer layer, are used in the negative **electrode** active material.
SOLUTION: In a negative **electrode** for nonaqueous

Applicant

electrolyte secondary battery comprising a mixture including a carbon material and a polyvinylidene fluoride resin as a binder and a rolled copper foil, a mixture of lumped graphite powder and mesophase pitch graphite fibrous material is used as the carbon material. Whereby the density and adhesion of the mixture can be improved, and the irreversible capacity and the generation of gas at a high temperature can be inhibited.
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